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Electrically Treated Light Wall Tubing

Process Developed by Snead & Co.—Properties of the Metal—Application of Nickel Steel Tubes, So Treated, to Automobile Shafts

THE proper heat treatment of light wall steel tubing on a commercial scale has been a desideratum for some time. One successful solution of this problem seems to have been found by Snead & Co., Jersey City, N. J. One of the difficulties in improving the quality of steel tubing in any heat-treatment process has been that the tubing, after being heated up to proper temperatures by the ordinary methods applied to other steel products and then quenched, has been distorted so as to be unfit for the use intended. By an ingenious application of electricity as the heating medium, this and other objections have been overcome by the company mentioned.

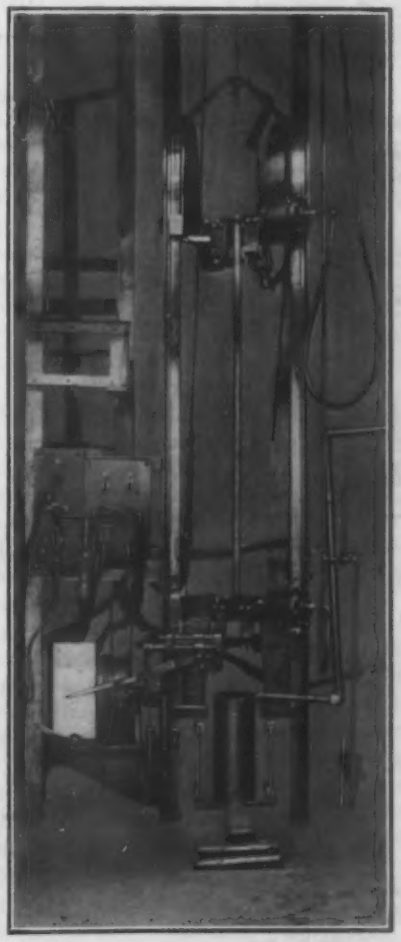
The new process was developed as the result of a search for a method of heat-treating steel tubing to be used as the shafts for lances for the Russian cossack cavalry. This was early in the war. Because of certain market conditions the only steel obtainable was a soft welded steel tube 1 in. in diameter, 20 gage and of 0.35 per cent carbon. In the finished lances an elastic limit of over 83,000 lb. per sq. in. was required to obtain a high degree of stiffness. The length of these tubes being 10½ ft. and extremely light, it was not possible to properly treat them vertically in any fuel-fired furnace.

The evolution of the process to its present commercial application is recounted as follows by H. P. MacDonald, vice-president of Snead & Co.:

A plan was developed for employing an electric current of low voltage and high amperage to heat the tubing by its own internal resistance and an apparatus was designed to accomplish this. The tube was held in a vertical position between copper contacts, which gripped it at its upper and lower ends, the upper contacts being fixed vertically and the lower ones free to move up and down with the tubing, the latter being brought to the same initial position for the start of each operation by a treadle and positive stop. The contacts were gripped by powerful springs and opened by cams attached to a vertical shaft. The current was led from a low-voltage transformer to the upper and lower contacts and the tube heated by its passage, in about 20 sec. On reaching the required temperature the contacts were opened and the tube allowed to fall vertically into a deep bath of oil situated directly underneath the machine. This process proved very successful.

On this machine no attempt was made to measure temperatures accurately, the elongation for a given temperature being figured out and the electric current shut off by a mechanically operated switch was tripped when the desired elongation was reached. It was observed, however, that the temperatures necessary for hardness were much lower than those required when a fuel-heated furnace was used, and in an endeavor to learn the cause for this I met Prof. James S. Macgregor of Columbia University, New York, who was looking for means to heat treat a lot of aircraft tubing for the Italian Royal Flying Corps. As a result a large quantity of tubing of various diameters, in lengths up to 22 ft., was heat treated satisfactorily, no difficulty being experienced in keeping the tubing straight and the process taking place so rapidly that the tube was not scaled. During this time the apparatus was being gradually improved and it was discovered that when the critical point of the material was reached the tubing, instead of continuing to expand, actually shortened in length, thereby indicating in itself the critical temperature, and means were devised for multiplying the movement and indicating the temperature on a dial.

Later on further improvements were made, such as hanging the upper contacts to cables passing over pulleys at the top of the machine, connecting these cables with a drum at the bottom and having the latter connected through spiral gearing so as to change the point of leverage on the temperature-indicating pointer in such a way as to



The Electric Heat-Treating Apparatus Developed by Snead & Co. for Treating Light Wall Steel Tubing. The changes in temperatures are recorded on the dial in the lower left-hand corner as the electric current traverses the tube, which finally falls into the oil tank below the floor

make the movement of the pointer constant for all lengths of material undergoing the same temperature change.

About this time work was also done for the United States Bureau of Standards, which was developing wing beam structures for all-steel airplanes, and tests on samples cut from a chrome-vanadium steel beam of about 0.25 per cent carbon and 0.018 in. thick showed the following results:

Proportional limit, lb. per sq. in.	112,000
Ultimate strength, lb. per sq. in.	218,000
Elongation in 2 in., per cent	2.7
Scleroscope hardness	75

These beams could be cut with a hacksaw after heat treatment.

A large quantity of steel tubing for use in landing chassis of Handley-Page airplanes was also put through this process with complete satisfaction to the Government inspectors, who required an ultimate strength of 110,000 lb. per sq. in. and an elongation of 15 per cent in 2 in.

Samples of 3.50 per cent nickel steel axles submitted to the Dayton-Wright Airplane Co. and tested in its laboratory gave the following results at different tempers:

Elastic limit, lb. per sq. in.	Ultimate strength, lb. per sq. in.	Elongation in 2 in., per cent
154,000	172,400	6.5
198,600	223,500	6.0
220,500	246,000	6.5

When the war ended we were working with the engineering division of the Air Service conducting tests on round steel tubes to be used as interplane struts.

Appearance of the Electrically Heat Treated Nickel Steel Tubing After It Has Been Joined to the Spider of the Automobile Propeller Shafts

The tests developed the interesting fact that the ordinary column formula failed to hold in steel of such high tensile strength. In the case of a tube having an ultimate strength of 193,000 lb. per sq. in. the compression results were 12 per cent higher than the strength computed by the formula, which checked out very closely on ordinary materials.

In the machine as it is now used the work is held in copper contacts operated by compressed-air cylinders and the temperature is indicated on the dial at the left, as shown by one of the illustrations, the pipe containing the quenching oil being shown projecting above the floor of the shop. The present type of machine allows the critical temperature of the material being treated to be determined readily while the work is in process, especially in the case of high carbon or alloy steels in which there is a very definite retrograde movement of the pointer when the calescent states of the material are reached. It has been found that these critical periods occur under electric treatment at very much lower temperatures, that is, from 50 to 100 deg. Fahr., than when the ordinary furnace treatment is used. It is not, however, necessary in the use of these machines to know beforehand the critical temperature as it is automatically determined in the process.

The advantages of this method seem to lie in the low temperatures necessary, speed of the heating operation which is usually a matter of less than one minute, thereby in most cases completely obviating the formation of scale and making possible the heat treatment of extremely light material, the complete control of the work and the high physical characteristics obtained, the reduction in area of the test pieces being particularly noteworthy. The process is also useful for discovering flaws or thin spots in the material undergoing treatment, this being particularly applicable to tubing, where any irregularity in the wall is shown up by that part overheating or heating more quickly than the other portions of the tube.

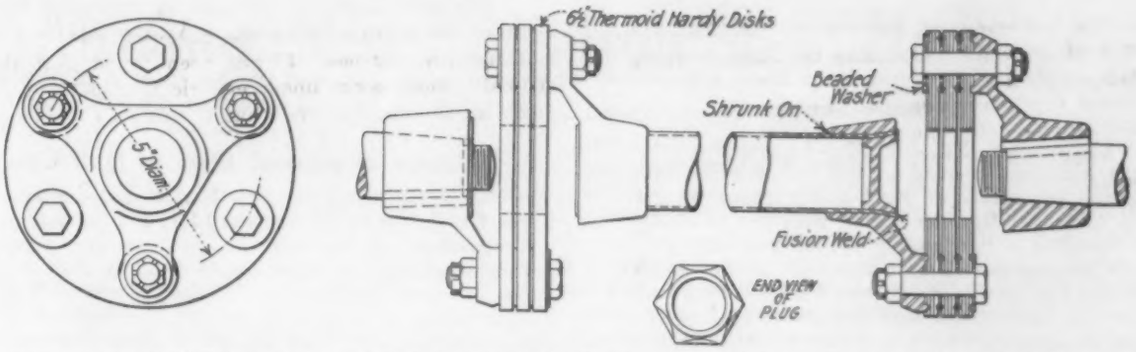
Three volts per foot of length of the material to be heat treated are found ample for any analysis, and a current density of 8000 amp. per sq. in. in cross-section is usually employed at the start of the process. The voltage between contacts increases as the temperature of the material goes up and the amperage correspondingly falls, the figures given being for the amperage taken at the first rush of current. In general practice for tubing, 0.1 kw. hr. per lb. of material heated up through its critical state is required. Solid bar stock takes about 0.06 kw. hr. per lb.

Previous experiments showed that where the material was quenched before the pointer showed the temperature beginning to increase again, the results were uncertain, and to obtain proper quenching conditions the old idea of "quenching on a rising temperature" had to be followed. The tests show that after the needle has once begun to indicate an increase in temperature after the drop at the critical point, practically the same results are obtained until the maximum temperature, reached before entering the critical period, is passed. After this there is a tendency for the grain of the steel to coarsen. These tests also indicate that a single quench on nickel steel heated electrically gives as good results as the double.

The importance of completing the allotropic changes in the structure of the steel taking place in the critical period is too well known to be more than mentioned, and these figures illustrate the amount of internal work that must be accomplished, neglecting the factor of radiation. In other words, 30 per cent of the total heat units necessary to put into this steel go into it after it has reached its maximum temperature and is passing through the critical period and before the temperature again begins to rise. Additional investigations are desirable along these same lines, particularly with reference to chrome-nickel and carbon steels.

The calibration of the machine was accomplished in the following manner: For the lower temperature lead, tin and zinc were fused on the work and the temperature run up until these materials were successively melted and then allowed to freeze slowly, and the reading on the dial noted. For higher temperatures and as a further check, the leads of a platinum-iridium pyrometer couple were placed inside of a heavy wall tube and pyrometer and dial readings taken simultaneously, the temperature of the tube being held constant at various stages by switching the current on and off.

A most interesting application to the automobile industry of nickel steel tubing, treated by this process, is the latest development in this field. It



How the Snead Cushion Drive Is Applied to Automobile Shafts. A specially constructed universal joint is a feature of this new departure

is the use of such tubing as propeller shafts for passenger cars and trucks. Snead & Co. already has a large department devoted to the manufacture of various sizes of such shafts which a number of automobile builders are using.

In the average propeller shaft a carbon steel tubing, untreated, is the main part, coupled to the universal joints in the usual manner. It is evident that the use of an electrically heat-treated nickel steel tubing in such shafts, is a source of distinct advantage. In the first place there is decidedly increased strength, the nickel tubing after the treatment having several times the tensile strength of the carbon tubing, even if it were heat treated. The automobile builder can readily appreciate this factor in the added stability of the motive power.

An important claim made for this kind of shaft is that its strength and toughness are such that under no conditions will the shaft whip. It is stated that this has been tried out in a number of cases and been satisfactorily demonstrated.

An ingenious method of attaching the propeller shaft to the spiders is a feature. One of the illustrations will elucidate this. The tubing is inserted cold into the center of the heated spider, which is so constructed that the counter-sunk position of it is hexagonal in shape. As soon as the tubing has been inserted properly, its edge only is heated to a cherry-red temperature by an oxy-acetylene flame. An hexagonal cap or sealing wedge of steel is then driven into this opening with a pneumatic hammer and the outer edges arc welded. The process is claimed to not only insure an unusually strong union of the shaft and spider, but there is the added advantage that the nickel steel tubing is in no manner harmed by the heating of the tubing in order to attach it to the spider. The line drawing also further explains this proceedure.

The method of connecting these propeller shafts to the propelling portions of the car is interesting. Instead of the usual universal joint, there is used a device consisting of three Thermoid Hardy disks separated by beaded washers and attached to both ends of the propeller shaft as indicated by the illustration. The use of this Snead cushion drive is claimed to insure remarkable steadiness in operation as well as unusual strength and resistance to shock.

It is believed that the possibilities of this process of heat treating steel tubing have been only partially developed, that the field has only been scratched. The cost of handling work by this process is dependent in the first instance on the available electric current. Heavy sections such as steel rails can be heat treated advantageously, it is asserted, but the success commercially depends on the solution of certain electrical problems. It would be easy to obtain a tensile strength of 130,000 lb. per sq. in. in an 0.70 per cent carbon rail by this process and there would also result greater reliability than now obtained in the ordinary rolled section. The advantages of the process are increased by the fact that pyrometers and refractories are not needed and that the method can readily be taught to operators. American and foreign patents have been granted covering all these processes.

Will Advertise Surplus Products

WASHINGTON, Jan. 20.—The method of conducting surplus property sales has been revised by the Director of Sales of the War Department with the view to better familiarizing a larger percentage of interested buyers and purchasers with the various materials and articles available.

Such surplus articles as are usable in the average household, of which the entire quantity can be sold through the quartermaster retail stores, will be offered for sale only through those stores. Similar items of which the quantity is too great to sell entirely through the quartermaster retail stores will have their unsold balances together with those items unsuitable for sale through the retail stores offered to the public in informal bids on advertised lists. Balances remaining after bids have been advertised and received will be sold at a fixed price which may be turned to a maximum price on a fixed trading basis. Items to be sold at auction will be offered in this manner and when the offers received are less than the satisfactory price they will be rejected and a fixed minimum price established.

It is planned to have the Surplus Property Division, Washington office, publish daily lists of surplus property in commodity group lists. Included in these lists will be such information as name, quantity, location, shipping unit, minimum quantity upon which bids will be received, and a report of the condition, description of commodity as well as the conditions of sale.

Copies of these lists will be forwarded to each zone at least 20 days prior to the date established as the closing date. The Washington office of the Surplus Property Division will place advertisements in the trade journals and newspapers when deemed advisable, calling attention to the sales. Publicity matter will be issued in such manner as to permit the general public to be informed at least two weeks prior to the date upon which the lists will be closed.

The days upon which the various classes of commodities will be sold have been fixed as follows: Monday, textiles; Tuesday, raw materials, machinery and engineering materials; Wednesday, general supplies; Thursday, medical and hospital supplies and motor vehicles; Friday, clothing and equipage; Saturday, subsistence.

Each zone will accept bids until 3 p. m., Eastern time, on the closing day for each list. Abstracts of the bids will be forwarded to the Washington office within 24 hours. When rejections are made on the list the items rejected will be considered immediately and the fixed trading price established. This will be a price at which the commodity will be offered to all buyers, subject to prior sale.

COKE LANDS SOLD

Extraordinary Demand from Steel Companies to Insure Supply

UNIONTOWN, PA., Jan. 20.—An unprecedented situation has been created in the Connellsville coke trade by the expansion of steel and furnace interests into the Connellsville coke region with the evident purpose of insuring a fuel supply by the purchase outright of coke properties. Almost overnight properties having a value of from $2,000,000 to $4,000,000 found an active market. Two deals involving an aggregate consideration of from $5,000,000 to $6,000,000 have been officially closed, and negotiations are known to be pending for the purchase of other plants.

With the coming of the new year the march against the Connellsville coke region by the steel and furnace interests was commenced. The first deal closed was the sale of the Orient Coke Co. with 480 beehive ovens and 1000 acres of coal and surface to the American Coke Corporation, a new company being organized with a capital stock of $3,000,000. The identity of the interests back of the new corporation has not been officially announced, but reliable information here is that the Midvale Steel & Ordnance Co. and the Wheeling Steel & Iron Co. are controlling factors. Frank E. Peabody and Eugene S. Reilly, of the Reilly-Peabody Fuel Co., Pittsburgh, are officially known to be in the deal.

The second property to be taken over by steel interests was the No. 1 plant of the Thompson Connellsville Coke Co., with 400 ovens and 1000 acres of coal. That property was sold by J. H. Hillman, who owns control to the Weirton Steel Co., Weirton, W. Va., and E. W. Mudge & Co., Pittsburgh. The consideration was not announced, but it is reported that the Thompson plant brought a better figure than the Orient property. Both are adjacent properties in the Lower Connellsville field. Julian Kennedy was president and principal stockholder in the Orient company at the time of its sale. R. M. Fry has been retained by the buying corporation as its general manager.

When the Orient deal was announced it also became known that other deals were pending for the purchase of coke properties by the new corporation. That statement has given rise to numerous reports. W. Russell Carr, of Uniontown; Frank E. Peabody and Eugene S. Reilly, are incorporators of the new corporation. All are directors in the American Connellsville company operating the two old Sunshine plants, and it would not be surprising if they were merged with the new corporation. There are also persistent reports that the Tower Hill Connellsville Coke Co. and the Katherine plant of the Union Connellsville Coke Co. are figuring in a deal, but whether negotiations are pending with the new corporation or with any other steel interest cannot be determined at this time.

When he announced the sale of the Thompson No. 1 plant Mr. Hillman took occasion to deny a report that the Thompson No. 2 plant and the two plants of the Hecla Coal & Coke Co. were under option to an independent steel company of Pittsburgh.

New Rail and Water Rate

Tariffs giving the new rail and water freight rates on Alabama iron to Boston and other New England points show a flat f.o.b. alongside rate to Boston of $5.75 per ton. That rate is to provide for the foundry interest desiring to purchase for shipment elsewhere along the New England coast, but comparatively little iron is so purchased.

The rail and water rate to interior New England points provides a $5.62 alongside Boston rate. To this is added 40c. for handling charges and the local rate, whatever it may be. For instance, the local rate from Boston to Lowell on iron brings the delivered price up to $7.02½, to Portland $7.52, to Springfield $7.42½, etc. Heretofore the general delivered price was $8 per ton.

The new tariff applies only to shipments made to Boston & Maine and Boston & Albany Railroad points. The tariff to New Haven points remains as heretofore owing to the fact that the Merchant & Miners Transportation Co. has not agreed to the new rates.

Takes Fabricated Steel at Half Cost

WASHINGTON, Jan. 20.—Under a settlement just reached by the Shipping Board and the Submarine Boat Corporation of Newark, N. J., a large quantity of fabricated steel is to be taken over by that company for one-half its cost to the Government. The steel in question is practically enough for the construction of 32 ships, contracts for which have been canceled by the board. The Shipping Board originally placed the contracts for 150 steel fabricated vessels of 5350 deadweight tons each with the Submarine Boat Corporation. Contracts for 32 of the ships were suspended some time ago and claims were presented for settlement. Under the agreement now reached the Submarine Boat Corporation will complete the 118 other vessels, 88 of which have already been delivered under the contract with the Shipping Board. The Submarine Boat Corporation also intends to complete the 32 ships, but on its own account with the expectation of offering them for sale as under the terms of the settlement the company will take over all the steel that has been purchased by the Government for these 32 ships. It is estimated that the total to be paid for this fabricated steel under the arrangement will be considerably in excess of $5,000,000.

Officials of the Shipping Board believe they have made a satisfactory deal. They point out that in the recent sale of a large quantity of surplus steel the best price obtained for fabricated steel was $25 a ton. Inasmuch as much of this steel cost in the neighborhood of $70 a ton, not including the cost of fabrication, its sale on the 50 per cent basis will net considerably more than $25. The settlement with the Submarine Boat Corporation also provides that the company shall take over its plant from the Government. It will pay a rental totaling $4,000,000 during the next four years, and is given option to purchase the plant at the end of that time for the payment of an additional sum of $1,125,000. The company will also pay a rental for the year to the city of Newark. The Shipping Board has reduced the price of the Submarine Boat Corporation type of vessels from $210 to $200 per deadweight ton. It is stated that the reason for this action is that this particular class of ships is less desirable than others, and that no reduction in other types is contemplated. A desire to facilitate the sale of surplus steel and other materials is one of the reasons for the decision of the Shipping Board to move the Philadelphia offices of the Emergency Fleet Corporation from Philadelphia to Washington.

Washington's View of the Iron Situation

WASHINGTON, Jan. 20.—"The outstanding feature in the iron situation," says the December review of the Bureau of Mines, "is the great prosperity of the industry. A domestic demand for iron and steel products that is sufficient to tax the operating capacity of the steel plants in the United States for many months makes the outlook exceptionally bright, especially with the domestic demand accentuated by foreign inquiries for American steel products."

Concerning the steel situation abroad the review says: "One of the greatest coal, iron and steel companies in German-Austria finds itself in a serious situation in regard to an adequate fuel supply, as most of the mines which furnished the coal or coke consumed by the furnaces are situated in the new Czech territory, and the Czechs have practically ceased supplying the Austrian iron works. As the Germans are not in a position to assist the company out of its difficulty, it has been proposed to resort to electric smelting as a solution. In normal times the company operates 12 furnaces and produces about 600,000 tons of pig iron yearly. At the present time but one blast furnace is running."

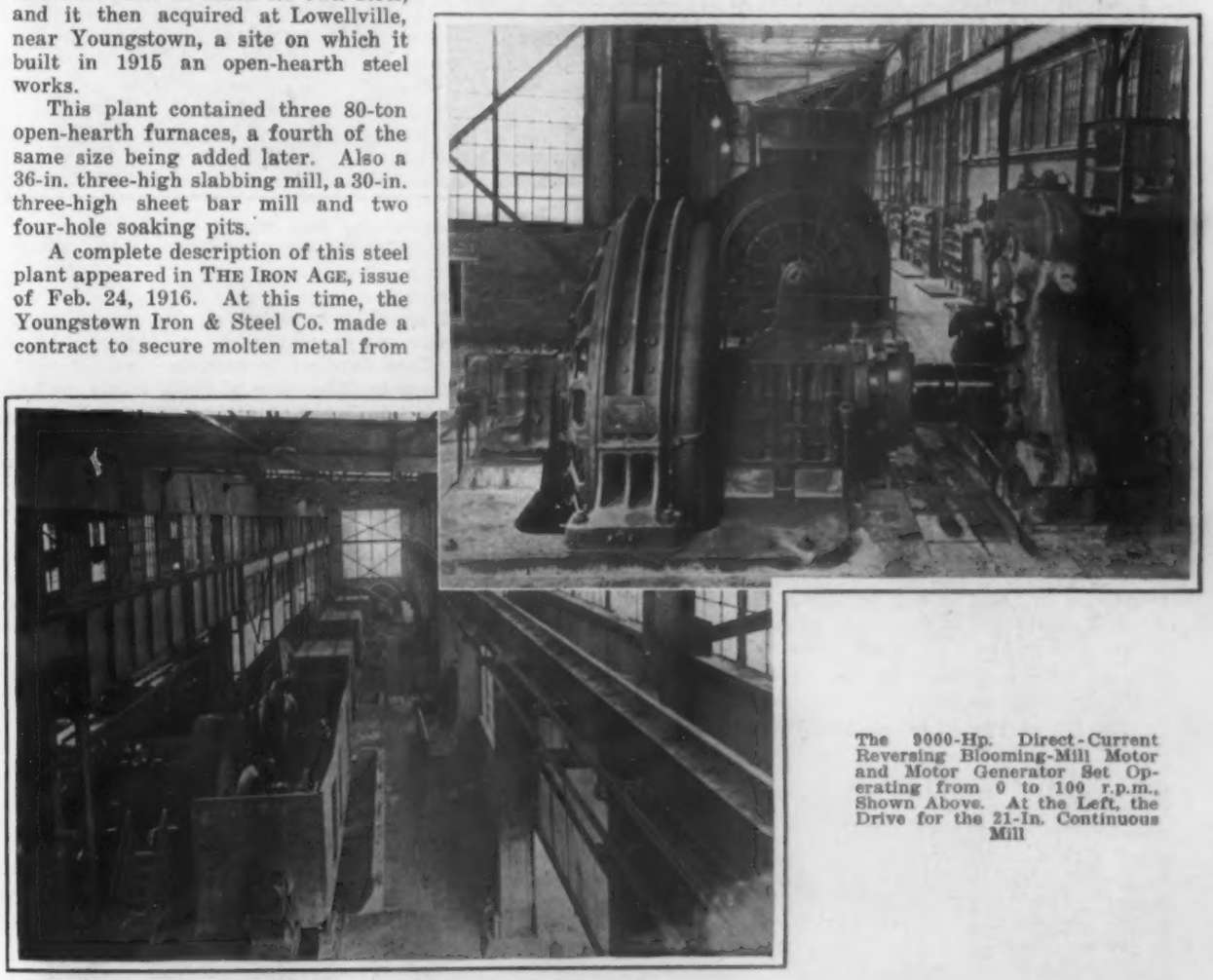
Rolling Mill of Sharon Steel Hoop Co.

Blooms Handled by Hydraulic Manipulator—21-In. Continuous Sheet-Bar and Slab Mill—The Steam Flying Shear

IN 1894, there was established at Youngstown, Ohio, a small company known as the Youngstown Iron & Steel Roofing Co., which had a capital of only $12,000, and which engaged in the manufacture of sheet steel roofing, conductor pipe and eaves trough, buying its sheets from mills nearby. The company was very successful under the management of John O. Pew, and in 1901 it erected at Haselton, near Youngstown, a plant containing nine hot sheet mills and other equipment for making black and galvanizing sheets, and in 1910 added a 72-in. three-high plate mill. The company found it desirable later to make its own steel, and it then acquired at Lowellville, near Youngstown, a site on which it built in 1915 an open-hearth steel works.

This plant contained three 80-ton open-hearth furnaces, a fourth of the same size being added later. Also a 36-in. three-high slabbing mill, a 30-in. three-high sheet bar mill and two four-hole soaking pits.

A complete description of this steel plant appeared in THE IRON AGE, issue of Feb. 24, 1916. At this time, the Youngstown Iron & Steel Co. made a contract to secure molten metal from



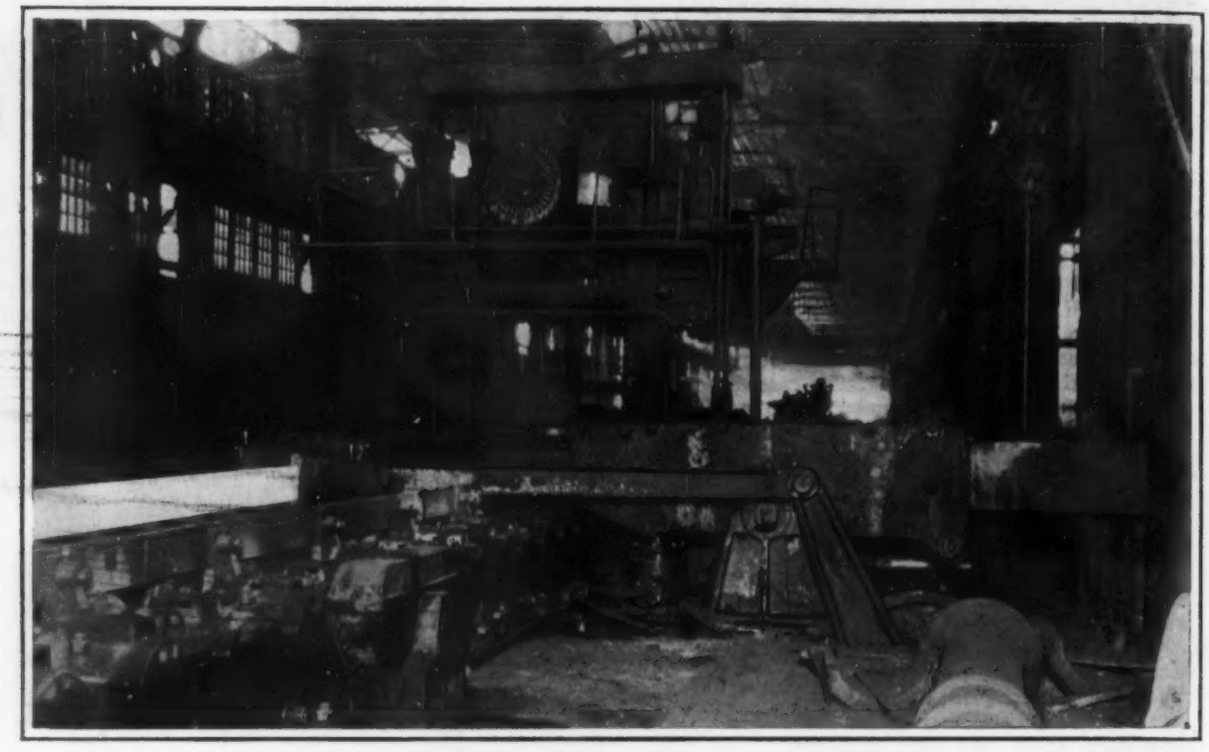
The 9000-Hp. Direct-Current Reversing Blooming-Mill Motor and Motor Generator Set Operating from 0 to 100 r.p.m., Shown Above. At the Left, the Drive for the 21-In. Continuous Mill

Mary blast furnace of the Ohio Iron & Steel Co., also located at Lowellville. It was now self-contained, having its own molten metal, open-hearth steel plant, sheet bar and sheet mills, also owning and operating the Youngstown Pressed Steel Co., making pressed steel specialties. The company was doing a very large business, and was in a flourishing condition.

In February, 1917, the Sharon Steel Hoop Co., Sharon, Pa., of which Severn P. Ker is president, secured control of the Youngstown Iron & Steel Co. and took over all its assets and properties. The Sharon Steel Hoop Co., which operates a large plant at Sharon, Pa., in the manufacture of billets, sheet bars, hoops, bands and cotton ties, and which has its own open-hearth steel plants and finishing mills, decided to enlarge the open-hearth steel output at its newly acquired plant at Lowellville, and there was completed early this year at Lowellville two more 75-ton open-hearth furnaces, giving a total of six furnaces of this capacity, also a new four-hole soaking pit furnace, giving a total of four pit furnaces, and an electrically driven blooming mill with all necessary accessories, also a 21-in. tandem slab and sheet bar mill. This mill equipment is to replace the 30-in. bar mill and the 24-in. universal mill which the Youngstown Iron & Steel Co. built in 1915.

The two new open-hearth furnaces are similar in design to those previously installed in the open-hearth plant. They are equipped with Blair electric operating valves and electric operating door lifts. The furnaces are served by a charging machine and 150-ton ladle crane built by the Morgan Engineering Co., Alliance, Ohio. This gives double handling equipment for charging and tapping the open-hearth furnaces. Three Morgan producer-gas machines were installed for each furnace. Two of these machines will operate a furnace with the third for use when running on poor coal. Concrete storage bins were built in the stockyard and so arranged that the raw materials may be dumped from the railroad cars directly into the bins and the materials then loaded into the charging boxes by means of a grab bucket which is operated from an overhead crane.

The new blooming mill is a 34-in. motor driven two-high reversing mill with manipulator and tables, built by Mackintosh, Hemphill & Co., Pittsburgh. This mill



The Approach Side of the 34-In. Motor-Driven Two-High Reversing Blooming Mill, Equipped with Universal Couplings to Take Up Backlash in Reversing. A special feature is the hydraulic manipulator, with new tilting mechanism

is driven by 9000-hp. reversing direct-current, 700-volt motor, having a speed of 0 to 100 r.p.m. The blooming mill was designed and built by Mackintosh, Hemphill & Co., and is of the latest standard design.

The rolls in this mill are 30-in. in diameter by 72-in. long and have a lift of 28-in. The screw-down mechanism is operated by two motors in series. All gears are totally inclosed and run in oil. The screw-down is of the hydraulic balance type. The feed rollers are driven by the extensions of the table side-shafts, making one continuous drive for each side of the mill. The mill is equipped throughout with universal couplings, to take up any back-lash due to reversing. All mill tables are of the latest design with cast steel rollers and gears. The gears have cut teeth and are totally inclosed, running in oil. All tables are motor operated.

The Blooming Mill Drive

The blooming mill is driven by a motor capable of delivering a torque of 1,000,000 ft.-lb. at 47 r.p.m. The motor is liberally designed to withstand the peaks encountered in reversing blooming-mill drive, and is provided with a thrust bearing to protect it from the severe mechanical shocks of the mill, such as the breaking of a spindle. The motor is artificially ventilated, the induction motor driving the blower being so interlocked with the main direct-current breaker in the reversing motor circuit that the breaker cannot be closed unless the blower is in operation. The reversing motor is controlled from the mill operators' pulpit by a master switch.

Once the flywheel set is brought up to speed, and the main circuit breaker closed, the reversing motor is controlled almost entirely from the pulpit in the mill. The ease and rapidity with which this motor can be started, stopped or reversed shows it to be inherently adapted to this class of service. This motor drives the mill without any sign of distress when taking 2-in. to 3-in. drafts on almost every pass, when rolling 22-in. ingots to approximately 4 x 8 in. and to 6 x 18 in. The reversing motor receives its power from a 2250-kw., 700-volt, 352-r.p.m., d.c., shunt-wound generator, which is designed to withstand the same peak load as encountered by the reversing motor.

This generator is driven by a 1500-hp. a.c. motor, which is designed to operate on a three-phase, 2200-volt, 60-cycle circuit, and is of the wound rotor type. A 60,000-lb. flywheel is mounted on the same bedplate with the motor and generator set, and between the two machines. This flywheel is entirely enclosed with a sheet-iron cover to reduce the windage losses, and also to afford protection to the operator. The flywheel bearings of this set are water-cooled as an emergency feature.

A liquid slip regulator limits the peaks and equalizes the input to the flywheel set. When the load on the a.c. motor reaches a predetermined value, the regulator introduces resistance in the secondary, which causes the motor to decrease in speed, thereby allowing the flywheel to give up some of its stored energy, and hence to absorb the peak loads. When the peak load goes off the regulator cuts out the resistance in the secondary, and thus brings the flywheel back to full speed. The regulator is so arranged that the a.c. motor cannot be started until the maximum resistance is inserted in the secondary by means of the regulator being wide open. The switching of the a.c. motor is so arranged that the flywheel set can be brought to a standstill within a short space of time by opening the forward primary oil breaker and closing the reverse primary oil breaker. The reversing motor and d.c. generator are separately excited, receiving this excitation from a small induction motor-driven exciter set.

Auxiliary Power Apparatus

There are two synchronous motor-generator sets in the power house for supplying the direct-current power to the auxiliary motors around the plant. Both are 250-volt machines; one is a 750-kw. and the other 500-kw. generator. In the power house there is provided a 100-kw. turbo-generator for emergency use in case the power from the power company is off for any length of time. This unit will furnish enough power to keep a part of the service pumps running, and furnish some lights. This plant uses central station power throughout, which is purchased from the Republic Railway & Light Co. An outdoor sub-station was installed on the company's property about ¼ mile from the power house.

The power is purchased at 22,000 volts, and is stepped down to 2200 volts through six 1500-kva. outdoor oil transformers. A spare transformer is kept in the outdoor sub-station for emergency. The oil circuit breakers for use with these transformers are electrically operated from the power house by direct-cur-

rent power. This direct current is supplied by a small flywheel motor generator set in the power house, which, in turn, receives its power from a small transformer in the outdoor sub-station. This small flywheel set was designed to be in operation at all times when power is on the 22,000-volt line, there being no switches between the induction motor of this set and the 22,000-volt line. The flywheel was designed to maintain the speed of the set, so that at the end of a certain period of time after the power failed the generator would be capable of delivering the necessary power for operating the oil circuit breaker. By this means the operator can clear the outdoor sub-station from the power house after the power has failed.

Hydraulic Manipulator of New Type

The hydraulic manipulator is one of the special features in connection with this new plant, and is of Mackintosh, Hemphill & Co. type, and is so designed that it has no racks or mechanism of any kind underneath the tables, everything being so laid out that it comes outside of the tables at all times. The tilting feature is new, inasmuch as the whole moving side-guard on the tilting side is raised up and has hanging on it several tilting fingers which catch the piece and turn it over. This is accomplished by means of a tilting cylinder placed alongside the table beams. The manipulator is self-contained and has no connection to the table whatever, except on the pusher side, where the end of the pusher bars are carried on the table beam.

The shear approach table is of standard design, motor-driven, and adapted to fit into a 10 x 10 vertical geared bloom shear. The shear delivery table is so designed that the tilting and stationary sections may be moved away from the shear, a distance of 3 ft., to allow the crop ends and small slabs to drop into a chute and then into the scrap box. The table is moved in and out, and also tilted by means of hydraulic cylinders.

Following the blooming mill shear is a 21-in. continuous mill complete with accessory equipment of shears, tables, cooling beds, etc., furnished by the Morgan Construction Co., Worcester, Mass. This mill produces from the direct ingot heat sheet bars 8 in. in width, from 6 2/3 lb. to 46 lb. per ft., and 12-in. sheet bars from 10 lb. per ft. upward. This mill also rolls edged slabs 2 in. thick and 7½ in. to 16 in. in width for later re-rolling in the hot-strip mill of the Sharon Steel Hoop Co. at Sharon. The capacity of this mill is limited only at the present time by the supply of hot steel from the blooming mill. Its ultimate capacity can be developed up to 100 tons per hr. The product of the blooming mill comes to the 21-in. mill in the form of slabs, which are 2 in. thick and 8 in. to 12 in. wide for sheet bars, and 6 in. thick and of suitable width for the edged slabs that are intended for the hot-strip mill.

The general arrangement of the 21-in. mill, cooling beds and drive is shown on page 256. It consists of five stands of horizontal rolls and three power-driven vertical edging rolls. The use of these vertical power-driven edging rolls precludes the necessity for tongue and groove passes, and permits the rolling in the entire range of product on the same plane cylindrical rolls. In other words, no roll changing is required to get the full range of sections for which the mill is designed. The vertical rolls also render it possible to produce sheet bar and slabs of exceptional accuracy in width and quality of edge.

When rolling sheet bars the first and second edging mills are employed, and free vertical loops are thrown after the second, third and fourth horizontal passes. When rolling slabs the second and third edging mills are in use. After the second pass the tandem rather than the pure continuous method of rolling is practised, that is, the bar runs free between roll stands, as shown on page 256.

The mill is driven throughout by high-carbon cast-steel cut bevel gears. The pinion housings contain herringbone pinions, which are cut from solid high-carbon steel forgings and are of the "built-up" type, standardized by the Morgan Construction Co. The two halves of the pinion are machined separately and have their teeth cut before they are shrunk on the pinion center. The roller straightener tables have dust-proof, self-oiling bearings and cut steel gears.

The Steam Flying Shear

Immediately following the mill is an Edwards-Carroll patented steam flying shear, shown on page 256. The continuous billet and sheet-bar mill could not have established itself so firmly for the production of small billets and sheet bar from the direct ingot heat, as an adjunct to the blooming mill, without the steam flying shear, which solved the problem of caring for a stream of metal issuing from the finishing stand of mills of this nature at delivery speed, which frequently attains 600-ft. per min.

After the sheet bar has been cut by the steam fly-

Delivery Side of the 34-In. Blooming Mill, with View of Hydraulic Manipulator Mechanism at the Extreme Right

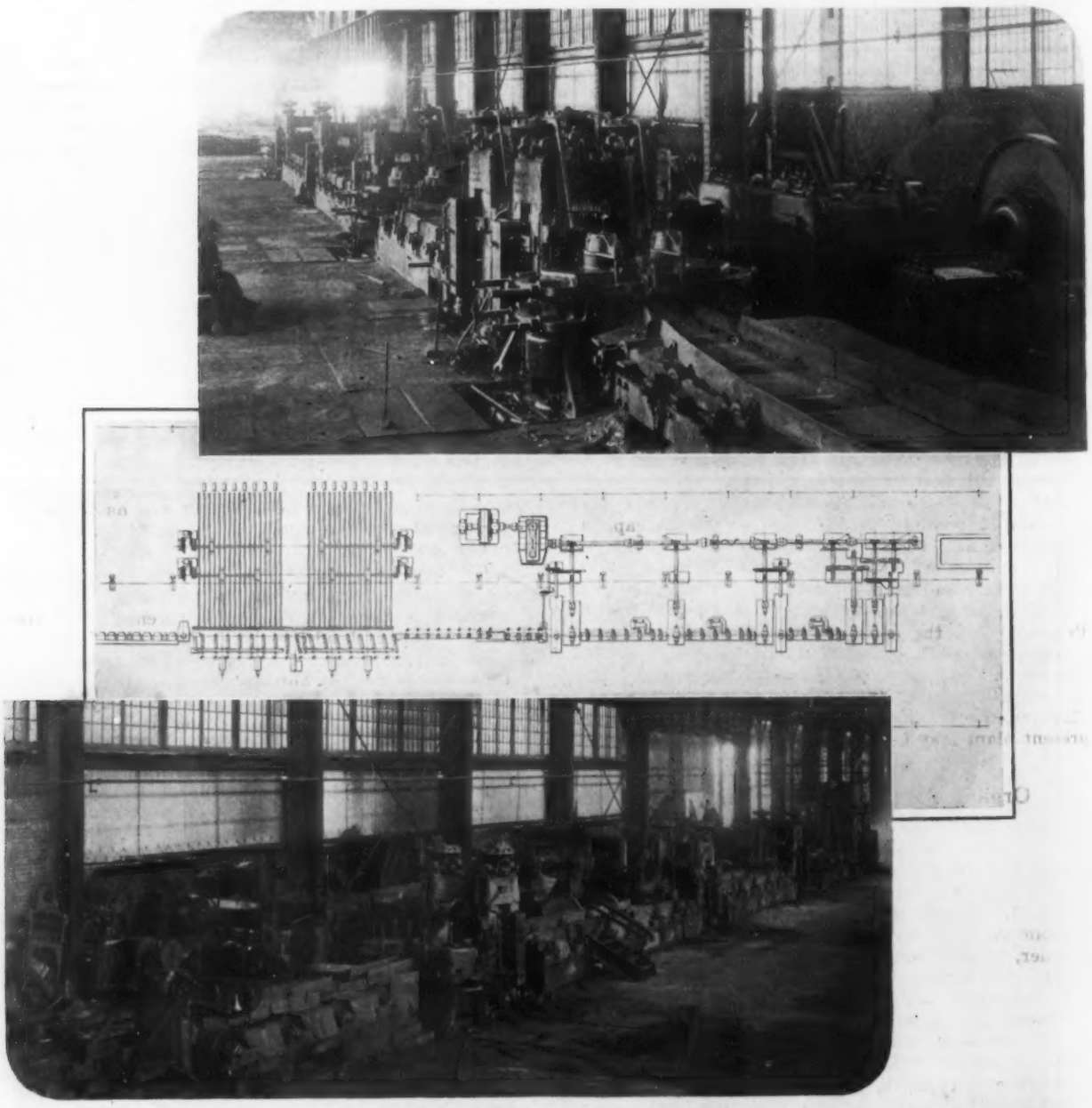
ing shear into 30-ft. to 35-ft. lengths, it is, in this case, carried across the skew table to the bar piling rolls, which stack it in the piling bin. This bin has adjustable sides so that any widths up to 15 in. can be piled in stacks up to 30 in. in height for convenient handling by the crane.

A skew assembling table is also provided with a disappearing stop. This table is employed when the mill is rolling slabs. They are assembled in batches on this table and then pulled onto the cooling bed by a traveling straight edge. The general arrangement of this 21-in. mill has been purposely made, so that it can be used later as a roughing mill for an 18-in. Morgan continuous sheet bar and billet mill. When this additional mill is installed the 21-in. mill will not produce sheet bars, but will deliver a slab 2 in. thick to the 18 in. mill, which will finish it into sheet bars, thus relieving the blooming mill, which will then not be called upon to roll slabs down to 2 in. in thickness, but can supply all slabs to the 21-in. mill at a thickness of 6 in.

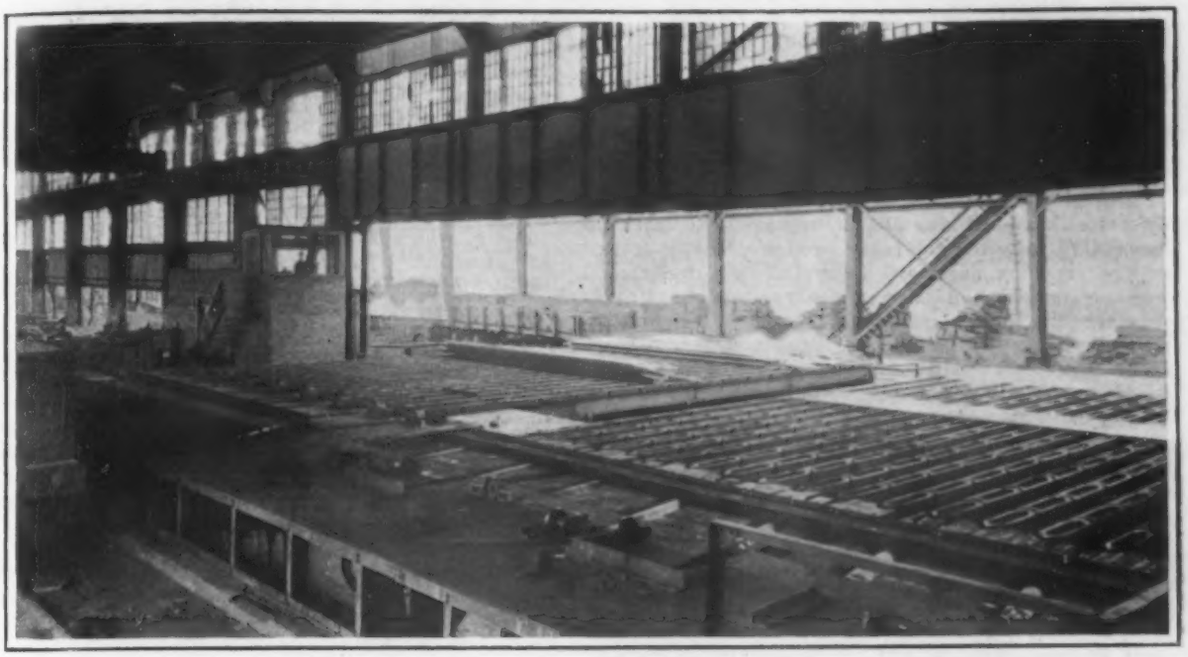
The mill is driven by an electric motor through a reducing gear unit. The latter was also designed and built by the Morgan Construction Co. This gear and pinion are also of built-up herringbone type. The two halves of the gear ring are belted to a permanently shrunk and keyed gear center, which remains in place on the gearshaft during the entire life of the gear unit, as the gears can be replaced without disturbing the gear center. The bearings on the gear unit are of the chain oiled type. The gears are fully enclosed in oil-tight, horizontally split gear casings, so arranged that the gear is readily accessible for examination. A small heavily stressed breaking spindle is interposed between the pinion and motor shaft, in order to definitely limit the stresses in the reducing gears, and in the mill transmission gear and shafts.

A 4000-hp., 360-r.p.m., 2200-volt, 60-cycle slip-ring induction motor built by the General Electric Co., drives the mill. Continuity of service is a vital consideration in the design of motor and control. Characteristic of this type of motor are: Large air gap; cast-steel rotor spider; rugged box-girder stator frame; thrust collar on the low, heavy pedestal at the coupling end to withstand the lateral thrust due to diagonal fracture of the breaking spindle; and heavily insulated windings reinforced by wedges and binding bands to prevent movement in the slots. Provision is made for moving the stator parallel to the shaft to facilitate examination of the rotor and also for movement at right angle to the shaft for adjustment of air gap. The brush holders are supported from the base, thus minimizing vibration and increasing the life of the collectors.

The auxiliary motors and control are also of standard



The Receiving End of the 21-In. Continuous Mill (Upper View), Delivery End (Lower View), General Arrangement of Mill, Cooling Beds and Drive Shown in Plan. It Comprises Five Stands of Horizontal Rolls and Three Power-Driven Vertical Edging Rolls



Cooling Beds for Slabs and Bar Piller for Sheet Bars

General Electric manufacture, totally enclosed in steel frames. The use of interpoles permits a minimum armature diameter, and consequently the low moment of inertia necessary for extremely rapid reversal.

Pittsburgh Knife & Forge Co. Building New Plant

The Pittsburgh Knife & Forge Co., which now operates a plant on the N. S., Pittsburgh, recently bought about 15 acres at Coraopolis, Pa., 15 miles from Pittsburgh, on the Pittsburgh & Lake Erie Railroad, on which it has started to build a larger plant for the manufacturing of drop forgings, mine forgings, car forgings and upsetter forgings. The new shop will be contained in a brick and steel building, 65 x 700 ft., and there will also be a brick and steel machine shop, 70 x 420 ft., a new boiler house to contain 500-hp. uni-flow boilers, vertical water tube boilers and a new office building, 60 x 60 ft. The forge shop will contain 16 drop hammers of 1000-lb. and 5000-lb. capacity, six upsetters of 2-in. to 5-in. capacity, five bulldozers, Nos. 3 to 27 of the William-White type, and six Bradley drop hammers from 60-lb. to 500-lb. capacity. There will also be other equipment for bending eye bolts and doing other work in connection with the new forge shop. The company will install machinery capable of grinding shear knives up to 18 ft. in width. Practically all the hammers will be furnished by the Chambersburg Engineering Co., Chambersburg, Pa. The company expects to occupy the new plant in three to four months, and will continue to operate its present plant on the N. S., Pittsburgh. Later, however, the present plant may be consolidated with the new works.

Organization of Electric Alloy Steels

Organization of the Electric Alloy Steel Co., recently incorporated at Youngstown, Ohio, for $1,500,000 to manufacture high-grade alloy steels, has been effected by election of the following directors: James A. Campbell, L. J. Campbell, L. A. Manchester, A. E. Adams, William A. Thomas, Charles S. Thomas and Jonathan Warner, all of Youngstown, and Maurice Joseph, Cincinnati. Directors elected these officers: L. J. Campbell, president and treasurer; A. E. Adams, vice-president, and L. A. Manchester, secretary. Members of the advisory committee are James A. Campbell, A. E. Adams and William A. Thomas. President Campbell announced that a plant will be erected on a site in Trumbull County, between Warren and Girard. With exception of Mr. Joseph, the directors are all leading executives in the Mahoning Valley. James A. Campbell is president of the Youngstown Sheet & Tube Co.; L. L. Campbell resigned Jan. 13 as vice-president of the Sheet & Tube company; L. A. Manchester is general attorney for the company; A. E. Adams is president of the First National Bank, and was formerly a director of the Brier Hill Steel Co.; William A. Thomas retired Jan. 10, after serving eight years as president of the Brier Hill Steel Co.; Charles S. Thomas retired last May as president of the DeForest Sheet & Tinplate Co., when its property was absorbed by the Republic Iron & Steel Co., and Jonathan Warner is president of the Trumbull Steel Co., Warren, Ohio.

Wickwires Will Control

Under the plan for the consolidation of the Wickwire Steel Co., Buffalo, and the Clinton-Wright Wire Co., Worcester, Mass., as the Wickwire-Spencer Steel Corporation, the Wickwire interests will have the voting control. There will be 330,000 shares of common stock, of which the Wickwire family will own 180,000. Of this number 80,000 will be known as class A common, and will be distinguished from class B common in that it will have preference as to dividends. Before a dividend can be declared on the class B shares, class A shall have received its dividend, but the amount is not yet announced. The class A shares are confined to the 80,000, which are in payment for the Wickwire ore lands. In addition to this stock the family will own 100,000 shares of class B common.

In addition to the announcement that T. Harry Wickwire, Jr., will be president of the Wickwire-Spencer Company, and George M. Thompson and Ward A. Wickwire, vice-presidents, the former as general manager, the latter in charge of the Wickwire plants, Frank Kilmer will be the treasurer of the corporation. He is now treasurer of the Clinton-Wright Wire Co., and before the Spencer Wire Co. entered the combination was assistant treasurer and secretary of the Spencer Company.

The meeting of stockholders of the Clinton-Wright Co. to ratify the consolidation has not been called.

During the past month the Standard Tank Car Co., Sharon, Pa., has received orders aggregating 400 cars of both types, flat and tank cars, and is unable to make deliveries on new business before May. Within the past two weeks final deliveries were made on an order for 500 cars placed with the American and French governments.

REFRACTORIES IN 1919

Industrial and Research Developments in the American Industry—Plans for the Future

BY F. W. DONAHOE*

During the war there was such an unusual call for refractories that it was almost impossible to meet the demand for any but the lower grades. And to do this it was not only necessary to replace the miners and plant men who had entered the service but also to increase the entire personnel of most refractories manufacturing plants. This, without doubt, had its effect upon the quality of the material produced; it was impossible to get quantity production and maintain quality with such depleted forces.

Since the signing of the armistice, however, fewer by-product coke ovens have been constructed, the production of metal has diminished and contemplated construction has been discontinued. The effect of this shortening of the demand for refractories has made itself noticeable in many ways, notably in workmanship. A representative of a large foreign steel plant made the remark in an American brick plant during November, 1919, that the silica brick in the cull pile were as good as he bought for run-of-kiln in his own country.

Plant conditions in the refractories industry have been improved during 1919; in several instances construction work and machine installation, begun in 1914, and then discontinued, was completed in 1919.

The research fellowship established by The Refractories Maufacturers Association (American) entered its third year last May. This feature of the work of the association has grown to a point where the corps of fellows has been increased and the laboratory space in the Mellon Institute extended. More than a thousand investigations of clay, both of raw and calcined, have been made, as well as tests on finished material. Many investments, foredoomed to failure, have been prevented. Many improvements in finished material have been suggested and instructions given as to the manner in which this improvement could be made. These improvements have not only had to do with the addition of missing ingredients and the changing of proportions of mix, but with mechanical features the effect of which has meant much, not only for the make of refractories, but for the user of this class of material.

Considerable progress has been made in the way of standardizing the product, not only as regards size and shape but quality and methods of testing to determine quality. The committee on standardization, connected with The Refractories Manufacturers Association has, by constant investigation of conditions in the various industries where refractories are used, made a gradual reduction of the special shapes that were at one time used in general practice in these industries. The substitution of standard shapes has, in many instances, greatly reduced the cost to the consumer and at the same time made prompt and efficient service much easier for the refractories manufacturer.

Comparatively few new refractories plants have been started during the past year, and the output has been lessened, by the going back into old lines, of the clayworking plants which took up fire brick as an emergency measure when the fuel administration curtailed the fuel supply of all building brick plants. The enormous stocks accumulated by some of these newcomers in the refractories field have since been sold, for the most part at less than cost of production.

On the whole, the industry has had a profitable year, the profit perhaps being more along the lines of improved product and better understanding with consumers than in a monetary way. The excess profits tax will not bother nearly so many refractories manufacturers in the early part of 1920 as it did the same companies in the early part of 1919.

*Secretary, the American Refractories Association, Pittsburgh.

New England Coal & Coke Co.

Within a week or so the New England Coal & Coke Co. will change its method of handling foundry coke after it leaves the ovens at its plant in Everett, Mass. By so doing the company will screen its product more satisfactorily than it does to-day, it will have closer regulation of moisture, and in addition it will minimize breakage.

The company started business in 1898. Since then improvements in equipment have been made, but the number of coke ovens of the Otto Hoffman type has remained the same, namely 400. The ovens are divided into batteries of 50 each. The ovens measure 17 in. on the pusher side and 19 in. on the other, and are 33 ft. long. Originally they were lined with quartzite brick, but subsequently with silica. The ovens are arranged in four groups of two each, two groups being lined up end to end. The other two groups are in parallel position. Located centrally in each group is a coal pocket of 1500 tons capacity, from which the larry cars convey to the ovens right and left. There are four such bins. Two coke pushers, one for each 200 ovens, operate in the space between the groups of ovens. Each pusher operates on 825 ft. of trackage.

The output of the 400 ovens, based on 24 hr. coking time, is about 1800 net tons per day, with the coal consumption approximately 2400 net tons. In its present production of foundry coke, the product is pushed from the ovens over the sill into the receiver and there quenched by hand hose operated from a platform. With the new method, for the time being at least, 200 of the 400 ovens will be devoted exclusively to foundry coke. The receiver, operated by electricity, delivers the coke to a wharf which slopes from the coke car to a series of small gates controlling the distribution of the coke to a belt which runs to a new screening house. Here it is put on a rotary disk screen of the latest type, which allows for screenings to drop through into a chute leading directly into a car below. The screened foundry coke passes to a conveyor belt, which loads the selected coke into railroad cars below arranged so that the drop is at a minimum. The belt system as well as the screening and picking house layout is controlled by a Cutler-Hammer system. The machinery can be started or stopped from any point by push buttons. The company plans to handle 900 tons of coke per day.

Youngstown Sheet & Tube Co. Will Not Accept Bonuses

President James A. Campbell informed salesmen that the Youngstown Sheet & Tube Co. had not accepted bonuses for the delivery of material and would not, at the annual sales convention of the corporation, Jan. 8 and 9, at the principal offices in Youngstown, Ohio. The announcement made clear that it was not the policy of the company to accept bonuses for delivery of product. The declaration is regarded as having an important bearing on the policy of all steel companies in the Mahoning Valley. Mr. Campbell's announcement was part of the speech-making program at the annual banquet Jan. 8 at the Youngstown Club. Other speakers were C. S. Robinson, vice-president and general manager; L. J. Campbell, who resigned as vice-president to become president of the Electric Alloy Steel Co.; L. E. Jenks, sales manager of the Chicago office; George M. Streeter, assistant to the general superintendent; Frank Purnell, sales manager of the Consolidated Steel Corporation, New York, and Vice-President Harry L. Barbour of the same company, who is the export representative of the Sheet & Tube company. Walter E. Watson, assistant general sales manager of the Sheet & Tube company, was toastmaster. About 60 representatives attended, consisting of managers of sales and their assistants in Pittsburgh, Philadelphia, New York, Boston, Cleveland, St. Louis, San Francisco, Chicago, Detroit, Denver, Seattle and Atlanta. The visitors inspected the plants at East Youngstown and Struthers.

Pulverized Coal in the Malleable Foundry

Apparatus Diffuses Coal and Air Outside of Furnace and Uses Low Velocity Jet—Nozzle Design — Application to Ovens

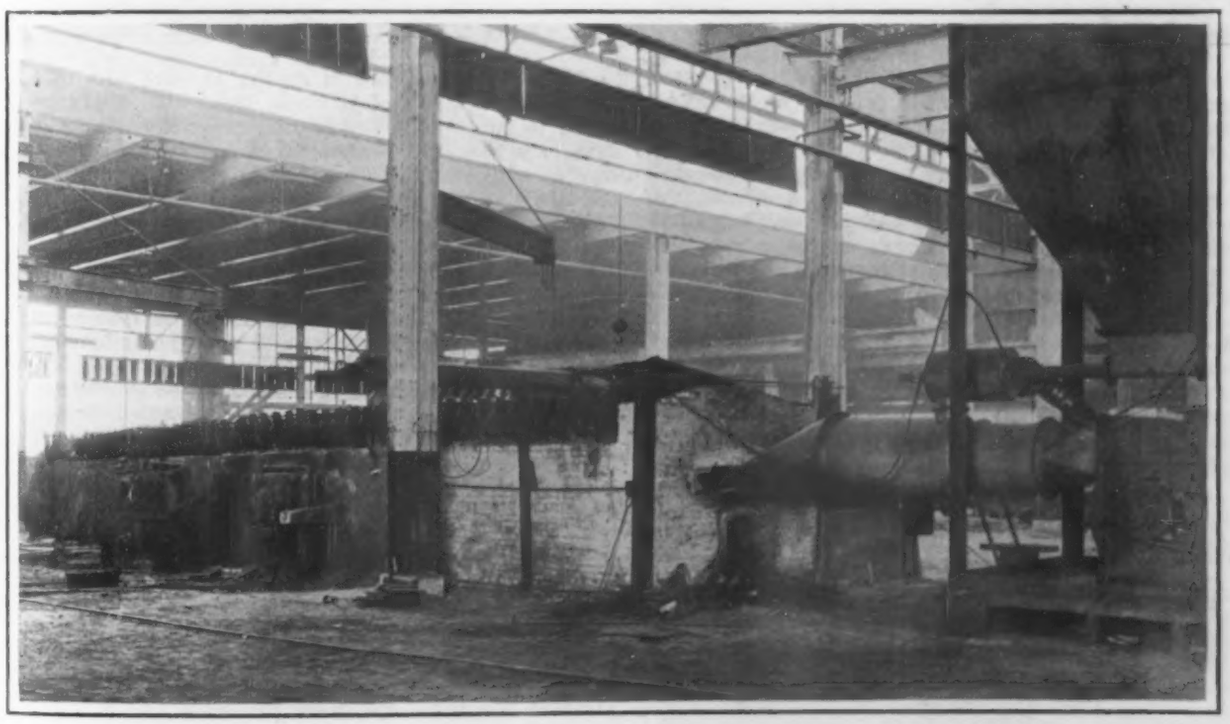
AN apparatus designed to mix the air and pulverized coal outside of the furnace, and which permits the employment of a low velocity jet, was described by Milton W. Arrowood, Ground Coal Engineering Co., Chicago, in a paper, "Efficient Use of Pulverized Coal in Malleable Foundry Practice," presented before the recent meeting of the American Foundrymen's Association, Philadelphia. Mr. Arrowood pointed out that there is probably no branch of industry that can realize greater benefit from the proper application of pulverized fuel than the malleable iron foundry. He discussed the conditions under which the fuel can be used successfully, and laid particular stress on the apparatus for burning the coal rather than on that for preparing it in the pulverized form and delivering it to the furnace. The speaker urged that the air and fuel be mixed outside of the furnace and described an apparatus which is designed to accomplish this purpose.

Apparatus for Diffusing Coal Dust and Air

In this apparatus the volumes of coal and air are successively divided into various smaller volumes, and so handled as to create a large number of eddying currents of air within the apparatus, thus to bring about the complete diffusion of the dust particles within the air. In order to secure rapid and wide diffusion, the ideal condition, Mr. Arrowood pointed out, would be to conduct a certain amount of air within a volume of coal dust, and by there turning it loose burst the particles apart in all directions. Then by subjecting this rough mixture to further treatment in an apparatus, creating a large number of eddying currents, uniformity of dust diffusion could be obtained throughout the entire volume of combustion air.

The first phase of this ideal process, it was explained, can be only approximated in practice, but the action of the coal control, the upper-part of the apparatus shown in an accompanying diagram, approximates the desired condition sufficiently for practical purposes. The coal dust as thrown off by the feed screw into the mixing drum of the coal control is attacked by a heavy blast of air, *A*, directed at right angles across its path. The coal and air then passes through the holes of the perforated screen in the drum, and in so doing there is a kind of kneading or wire-drawing effect, tending to equalize the dust diffusion in the air. The jets issuing from the screen holes, *B*, flare, and on coming in contact with the outer drum, burst into reverse flow lines somewhat on the order of a mushroom head. The distance between shell and drum being small, there is opportunity for a rebound of the current against the outside of the perforated shell, if the flow lines have not already been lost in the mass of eddying currents, all of which are ultimately drawn together at the one large outlet, *C*, there to receive a general kneading to make a diffusion more uniform.

As it is desired to work on accurately proportioned mixtures of air and coal, the diffusion is still further carried out in the discharge section of the apparatus, which is the mixing chamber proper.

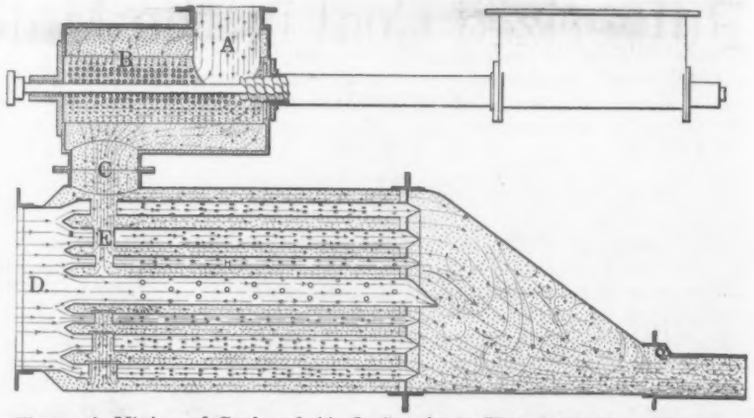


Pulverized Coal Is Delivered to the Front End of This Melting Furnace by the Mixing Apparatus Shown. The coal control, which is attached to the bottom of the coal hopper, contains the feed screw which delivers the coal to the control mixing drum seen at the left behind the post. The blast fan is mounted directly at the right of the short outlet connection which connects it with the 24-in. valve and hence to the burner

The partially mixed material coming from the coal control enters the burner at *C*, which shows what is known as a quadruplex burner, so called on account of its having four sets of mixing shells concentrically arranged. This burner, which is 30 in. in diameter and about 10 ft. long over all, is of the size and type generally used for the air melting furnace. The design is capable of being used with any number of the mixing shells and in the smaller sizes one or two sets are usually employed. On the average malleable annealing oven, for example, two sets of shells will ordinarily be employed and the outside diameter of the burner will be from 6 to 10 in. and the overall length from 3 to 4 ft.

The partially mixed air and coal, on coming from the coal control and entering the burner at the point *C*, is divided by the successive communicating tubes, *E*. This mixture enters each of the four coal and air (*C*-and-*A*) strata, while at the same time additional air in an amount regulated to give a balanced mixture, enters the open end of the burner through a 24-in. valve. Some of this air passes into the center pipe, while the remainder goes into the air strata which are concentric and just inside their respective *C*-and-*A* strata.

The outer shells of all air strata and the inner pipe contain a number of holes arranged in successive staggered rows, a total of 1516 holes being used in all the shells of the 30-in. burner. These 1516 jets of air were emphasized as giving a tremendous mixing effect in the comparatively thin strata of partially mixed coal and air streams.



Thorough Mixing of Coal and Air Is Sought in This Apparatus. Numerous eddying currents are formed in the nozzle and the mixture is kept in violent agitation until the moment of discharge into the furnace as a rolling, eddying mass of air currents uniformly charged with dust

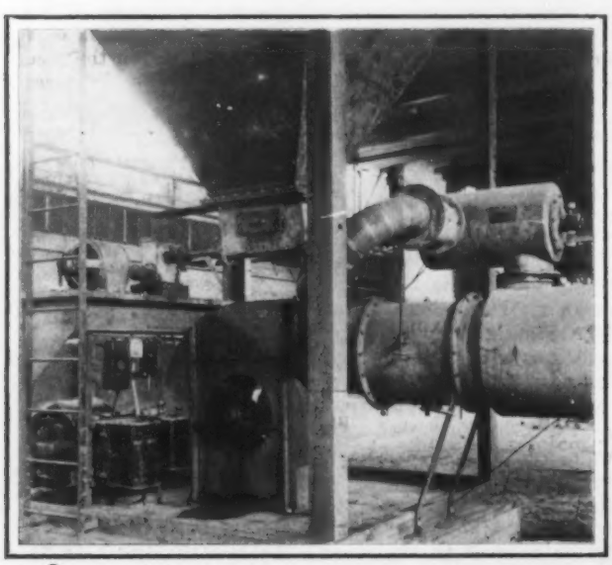
The radial distance between the shells being comparatively short, it was explained, insures a good jet-piercing effect into the resilient *C*-and-*A* strata of material. The analogy here is that of cutting a thick piece of rubber with a knife; the first instinct being to place the rubber on a hard surface. With usual fan blast, it was pointed out, the air jet will pierce little more than 2 in., so at this distance a solid backing is provided.

Numerous eddying currents are formed in the nozzle and the mixture is kept in violent agitation until the moment of discharge into the furnace as a rolling, eddying mass of air currents uniformly charged with dust. This whirling effect in the material as discharged, it was stated, is of value in securing rapid ignition by bringing the inner portions of the mass, especially in the larger burners, in contact with the outer ignition film of mixture.

Mr. Arrowood pointed out that even with comparatively large nozzles and low discharge velocities, the burner shows no tendency to back fire, and explained this as probably being due in some degree to the eddying currents tending to damp or break up any incipient flame current propagation in a direction toward the burner. The elongated rectangular nozzle, it was also stated, appears to have a certain damping effect against back firing, particularly in the smaller sizes. Mr. Arrowood stated that in the experimental work with burners of this design, it was early discovered that the discharge velocities could be reduced to a point much lower than had previously been considered possible.

Resulting Advantages in the Furnace

The benefits derived in the furnace from this mixing and heating apparatus were discussed in detail. Owing to the low discharge velocity, the speaker said, it was found that the mechanical erosion and abrasion of brick was eliminated. This saving of brickwork and also the complete combustion from mixing reduces the amount of slag in the furnace, so that the slag to be considered is practically only that resulting from the fusible material in the ash of the coal.



Operating Side of Burner, Showing Location Controls

The subject of flame ignition and formation was discussed in detail. The discharging stream, it was explained, should be of form to present the greatest practical area of contact surface for ignition. This was emphasized as an additional reason for the elongated rectangular form of nozzle, which affords a larger surface of ignition contact for the issuing stream than would be the case with a circular nozzle having the same cross-sectional area.

It was explained that in smaller burners with thin discharging streams of mixture, the entire discharge seems to ignite from the burner, especially when the furnace is hot. The combustion chamber should therefore be long enough to accommodate this burning jet and allow reasonable expansion of the flame produced before reaching the bridge wall, as otherwise the flame will be chilled too much and will make the furnace sluggish in firing up. In practice it is found that little if any change need be made in the usual length of combustion chamber, but the volume should be reduced to correspond with the less volume of gases being handled with a balanced mixture. This is best done, Mr. Arrowood stated, by building the floor of the combustion chamber only a few inches below the top of the bridge wall, the bottom of the burner nozzle being usually set in line with the top of the wall. The burner so erected, he said, is capable of feeding, mixing and burning from 1000 to 3000 lb. of coal per hour when supplied with blast air at a pressure of 2 to 3 oz. and with a pressure of 5 oz. it may feed as much as 5000 lb. per hour. In malleable practice, with this flame, Mr. Arrowood stated, the interior walls of the furnace take on a glaze and show practically no signs of erosion.

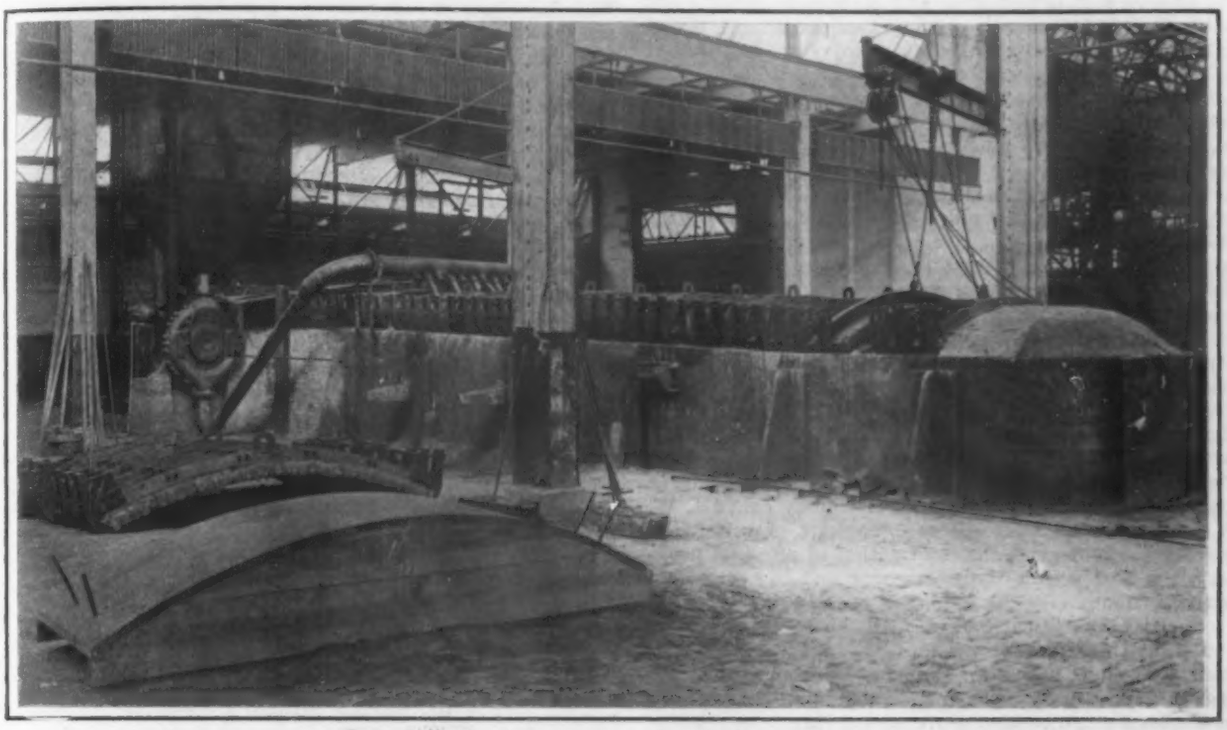
The data and results of a series of tests on an air melting furnace, using a 14-in. duplex burner at a plant at Meadville, Pa., were presented and a 30-in. burner installation at a furnace built for capacity of 10 to 15 tons in a foundry in Erie, Pa., was described.

In malleable iron annealing the burner described, it was stated, can perform functions equally as satisfactorily as in the air melting furnace. For greatest economy in the use of pulverized coal, the ovens should be of comparatively large size. It then becomes a problem of uniform heat distribution and control so as not to burn the pots. With some types of pulverized coal burners it is found that the heat is thrown in too great degree toward the front end of the ovens. At times the poor heat distribution with high velocity burners results in burning top pots near the burner, while the bottom ones on the same stools may not be annealed. Where a cutting flame cuts down the brick of the firebox the destruction of pots near the burner may be aggravated from slag deposition and fluxing.

At other times, if the coal is a little damp or not ground as fine as usual, some of it may be deposited on the floor and blanket the bottom pots near the burner.

For reasons mentioned, Mr. Arrowood explained, the complete mixture delivered by the burner under consideration, avoiding a cutting flame, largely overburner. These burners should with proper damper regulation of the oven produce more uniformly annealed castings than heretofore has been the practice. The first of these units on a pot oven is now being installed at Buffalo, N. Y.

Mr. Arrowood explained that while no commercial



Pulverized Coal and Air Mixing Apparatus Arranged for Top Blast

comes the slag difficulties and at the same time prevents an undue part of the hot gasses being driven to the front of the oven. The low feeding velocity gives a certain time element for the gases to expand and normally fill all parts of the oven, especially near the

installation has yet been made on the muffle type of annealing oven, a number of test runs were made on such an oven handling railway castings. Details of the run were given, and it was stated that the castings obtained were of excellent quality.

Accidents in the Coke Industry

WASHINGTON, Jan. 20.—Accidents in the by-products coke ovens of the steel industry have reached a higher frequency than blast furnace accidents according to the comparisons made by the Bureau of Labor Statistics. The following table reveals a comparison in the death rates of by-product coke ovens and blast furnaces from 1915 to 1918:

Year	By-product coke ovens	Blast furnaces
1915	1.20	1.80
1916	2.30	1.50
1917	3.90	2.20
1918	2.90	2.50

"It is evident that some general cause," concludes the report, "has been operative tending to higher rates during the later years. Although new plants have been coming into operation rapidly during the interval, it does not seem reasonable to suppose that they are markedly inferior in the matter of safety provisions or operation methods. It seems much more likely that the disturbed situation of the working force which is characteristic of the war years is mainly responsible. It may also be suggested that the influenza epidemic in the latter part of 1918 may have had considerable influence on the accident rate.

"In both beehive and by-product ovens the prolific cause of fatal injury is the transportation system. Of the rate in 1918 of 2.84 per 1000, 1.36 cases are credited to various elements of the transportation. This hazard has been found everywhere a difficult one with which to deal. If given adequate engineering attention, it has not been found impossible to change for the better.

"The demonstration which this report affords, that as at present operated, the by-product oven is to be classed as highly hazardous, should lead to serious inquiry on the part of those in charge regarding improvements in the present situation."

Danger in Use of Coal Dust

WASHINGTON, Jan. 20.—Because of the increasing use of coal dust for heating in the Pittsburgh district steel mills, the Bureau of Mines has made an elaborate investigation of the explosion hazard in connection with this fuel, and has issued a series of cautions to avoid this danger. These warnings should be of particular interest to every mill using coal dust.

The decreasing supply of natural gas has largely resulted in the greater use of pulverized coal, and elaborate installations have recently been made in the steel plants to powder the coal and convey it to the furnaces. It has been found, however, that soon after the furnaces commenced to operate with the pulverized coal, large quantities of fine dust began to accumulate on the platforms over the furnaces, the roof trusses, on the outside of the various pipe lines, electric cables, and even on the roofs of the buildings. Some of the companies, becoming alarmed, requested the Bureau of Mines to make an investigation to ascertain the liability of this dust to cause an explosion. While conducting this investigation an explosion occurred in another mill which caused the death of one man and severely burned two others.

Ashtabula, Ohio, through its Chamber of Commerce, is making efforts to secure a sheet steel plant for that city. Efforts are being made to raise $1,500,000 for an eight-mill plant. Robert Locke, now associated with the Monongahela Iron & Steel Co., has become interested in the project and has submitted plan for a plant to members of the Chamber of Commerce.

NEW ENGLAND ASSOCIATION

Iron and Hardware Men Listen to Earnest Addresses by Congressmen

The New England Iron and Hardware Association held its twenty-seventh annual banquet at the Hotel Somerset, Boston, on the evening of Jan. 13. About 170 members and guests attended.

Charles W. Henderson, Jr., president of the association, presided. He introduced Hon. Samuel L. Powers as toastmaster, who lived up to his reputation as such. Mr. Powers appealed to the association, in making its usual annual gift to him, to make it a barrel of flour or a ham or two, in place of a clock, a 1919 gift. While he appreciated the clock, he said, he felt that with the present high cost of living he could use the flour or ham to better advantage.

Toastmaster Powers introduced as the first speaker of the evening Hon. M. M. Neely, member of Congress from West Virginia, Democrat. Mr. Neely informed those present that the country was facing its fourth great crisis, the first being our fight for independence, the second the Civil War, the third the World War, and the fourth crisis, the present political and scarlet disease which is proving more rapid than pneumonia and more fatal than the cancer, commonly called I. W. W.-ism. This scarlet disease, he said, favored the tearing down of jails, the confiscation of personal property, the destruction of Government and the establishment of labor.

"Russia has tried it out. Look at her to-day. Do you want this disease in your fair land? I think not. Well, then, it is high time that you awoke to the situation in your country as it exists to-day." Mr. Powers took exception to college professors trying to win popularity through public sanction of the red cause, through free speech, in a manner that left no doubt of his personal opinion of such men. He said it was up to every business man present and in the country to make an appeal through labor for the putting down of the rapidly growing red terror. He said that labor was American at heart, and if appealed to in the right way could materially help the country. He believes that the practice of working a man 12 hr. per day, seven days a week, should be abolished. He believes the business man should strike down profiteering, which is simply an excuse for much of the present unrest. He believes that foreigners coming to this country should be shown by the business man the advantages of being an American citizen, and he appealed to business to not expect Congressmen to legislate downward the high cost of living. He wants everybody to throw aside party politics and to vote for the right Government principle.

His address was filled with fire, but was mild as compared with that made by Hon. Simeon D. Fess, member of Congress from Ohio, Republican, the second speaker of the evening. Mr. Fess said he favored the cancellation of Mr. Berger's citizenship papers and his transportation from Wisconsin to Germany. He also said that he felt reasonably certain that the Government was through loaning money to European nations, and he pointed out that to continue the banker of Europe will result in an inflated paper currency in this country that spells bankruptcy. He said that 60 per cent of the world's copper, 40 per cent of its lead, 50 per cent of its zinc, 66 per cent of its oil, 40 per cent of its silver, 52 per cent of its coal, 41 per cent of its iron and steel, 20 per cent of its gold, 75 per cent of its corn and 25 per cent of its wheat are in this country of ours, and that we are in a position to feed, clothe and rebuild the world, but that other countries, notably Mexico and China, could accomplish the same thing and he could not see why we should risk our financial foundation by doing what every European country wants us to do.

Mr. Fess said he heard Samuel Gompers state that labor will not surrender all it gained during the war. He felt that if Mr. Gompers voiced the opinion of labor, the situation indeed was serious. He told of the struggle going on inside the labor circles and of the efforts of the I. W. W. faction to overthrow the American Federation of Labor. He told in considerable detail the causes for and present condition of our inflated credit situation. The Federal Reserve Board, he said, is trying to reduce the high cost of living, but it can not accomplish this task by a reduction in wages. "The high cost of living always goes higher than wages, and a reduction of the latter is one of the last things that can safely be accomplished."

He believes that to combat I. W. W.-ism successfully, we must conduct an educational campaign along the same lines as we did the Red Cross, Liberty Loan and other drives.

Mr. Powers then introduced Hon. Channing Cox, Lieutenant-Governor of Massachusetts, who spoke briefly on radical conditions existing in the state and country to-day. Owing to the length of Mr. Fess's address, and the lateness of the hour, Rev. Dr. Ashley Day Leavitte, who was due to speak next, begged to be excused. President Henderson then adjourned the banqueters.

The ball room, in which the dinner was served, was beautifully decorated with the National Flag.

Receiver for Machinery Company

Bion C. Pierce, of Taunton, has been appointed receiver for the Nelson Machinery Co., Taunton, Mass., by the United States District Court, Boston. A. H. Nelson is president of the Nelson Machinery Co., as well as the Nelson Blower & Furnace Co., Boston. In effect the former company is a subsidiary of the Blower & Furnace Co., but in reality it is not, inasmuch as the latter does not own 95 per cent of the machinery company's stock, as the Federal income tax law requires. But the Nelson Blower & Furnace Co. has much work that it has to give to outside interests, and the machinery company was organized for the primary purpose of providing a means for carrying out this work.

The York, Me., County Trust Co., with a claim of $10,000, brought action for the receivership. The plaintiff places the liabilities of the machinery company at $160,000. Evidence submitted to the court indicates the Nelson Machinery Co. can meet its liabilities. The receivership should materially assist F. Alexander Chandler, Chandler & Farquhar Co., Boston, receiver for the Nelson Blower & Furnace Co., in placing that company on a strong financial basis, which he hopes to do within a comparatively short time, inasmuch as it will allow him to place large orders with the Nelson Machinery Co. without fear of such work being held up by attachments on the machinery company's funds.

Colonial Motors Corporation Buys Factories

Springfield, Mass., and Boston interests have chartered under Massachusetts laws, the Colonial Motors Corporation, of Boston, with a capital of $5,000,000, divided into 200,000 shares of common stock, par $10 a share, and 30,000 shares of 8 per cent cumulative preferred stock, par $100.

Two factories have been purchased under contract, but the company has not taken title. Because of several details to be worked out, the officers of the new corporation are not ready to disclose the location of its plants.

Melvin F. Hill, 144 Clark Road, Brookline, Mass., is president of the company, and James W. Milne, 25 Elliot Street, Watertown, treasurer. The board of directors includes Messrs. Hill and Milner, George S. Hollister, Boston, and Charles W. Dodson and Earl E. Beveridge, of Springfield, Mass.

According to present plans the company should be on a full operative basis by March 1.

The Bridgeport, Conn., District Salvage Board offers for sale by negotiation, 158,627 lb. cold rolled steel, 37,160 lb. hot-rolled steel and 99,645 lb. screw head stock, all located at the plant of the Winchester Repeating Arms Co., New Haven.

A Training Plan for Foundry Workers

Plan for Upgrading Laborers and the Semi-skilled—Hindrances to Apprenticeship Development—Need for Competent Local Instructor

DISCUSSING "Training Men for Foundry Work," before the American Foundrymen's Association at Philadelphia, C. C. Schoen, of the U. S. Training Service, Stamford, Conn., stated that a survey of 646 foundries doing war work showed only about 1 per cent employing a definite program of training for foundry work and 65 per cent out of 440 active in upgrading their help.

A special committee of the training service was appointed by the director to study foundry work with a view of suggesting a training program for the improvement of operations and workers in the industry. Its investigation and recommendations were submitted by the author, as follows:

Considering the high turnover prevalent in foundry apprenticeship, which in some cases has been given as high as 150 per cent, it is evident that the number completing their apprenticeship is very small. In general, the following reasons were given for the present lack of apprenticeship training:

1. Reluctance of young men to engage in foundry work.
2. Ease with which many young men with limited experience and knowledge can secure employment as journeymen.
3. The tendency of foundry employees to discourage apprentices.
4. Inability of foundry owners to master their training problems, etc.

Causes of the reluctance of young men to engage in foundry work have been given as low wages, unsanitary conditions, laborious work, monotonous routine, adverse influence of public schools, the four-year apprenticeship clause, lack of any sound, practical, or definite training program, and lack of proper incentives.

In order to solve the wage problem, a few foundries make a practice of studying the cost of living in their town and granting apprentices' cost of living plus a percentage, ranging from 10 to 70 per cent. The highest percentage is paid to apprentices in their last year of apprenticeship.

A handicap, which many foundries have applied to their apprenticeship systems, is "inertia of habit." Systems with the indentured agreements and rates of pay instituted 15 years ago are still in use, although perhaps not operating.

Working toward the elimination of the effect of low wages, the four-year apprenticeship clause, the institution of proper incentives, etc., a plan is being developed whereby an apprentice's work, length of indentured period and compensation is dependent upon merit and accomplishment rather than time. This involves placing all apprentices on a two months' trial, and those accepted at the end of every six-month period are graded into classes as follows:

Class A, apprentices serving 825 hr. per period.
Class B, apprentices serving 962 hr. per period.
Class C, apprentices serving 1100 hr. per period.

The compensation is as follows:

Periods of entire course	1	2	3	4	5	6	7	8
Per cent of journeyman's pay	33	36	39	43	47	52	58	66

To overcome the laborious and unsanitary conditions existing in many foundries the adoption of sanitary, safety and labor-saving regulations as recommended by the American Foundrymen's Association and others is recommended.

To eliminate the condition of monotony, and to work toward a sound, practical and definite training program, the committee recommends a more general routing of apprentices into the different branches of foundry work and co-ordinating this practical experience with definite, practical technical instruction.

The ease with which many young men, with limited knowledge and experience, can secure employment as journeymen is a direct result of lack of training. We have established a low standard in the foundry and apprentices apparently find a short term sufficient to measure up to the standard set.

The tendency of foundry employees to discourage apprentices must be overcome through education. Many employees sincerely and honestly discourage apprentices because they labor under unsanitary and unsafe conditions. There are other employees, however, who discourage apprentices because of selfish motives. Cases have been brought to light where journeymen and foremen advised apprentices that a study of technical subjects was non-essential and at the same time they secured for their private study copies of lessons given apprentices.

A number of foundrymen complain of journeymen discouraging apprentices in order to minimize the number of available molders.

The inability of foundry owners to master their training problems is chiefly due to lack of knowledge of the subject and the fact that they too often delegate this work to an overburdened foreman or a person incompetent to effectively operate the plan.

A clear conception of the purpose in view, an understanding of the methods and kind of authority necessary to achieve this purpose, ability to secure co-operation, centralization of training responsibility, a definite training program, practical instruction, workable standards, accurate records, and a square deal are essential to success.

Existing conditions in the foundry industry necessitate a more general use of the upgrading system, which involves an intensive short-time training of the present labor and semi-skilled help.

In order to meet this condition and at the same time pave the way for a broad training, the branches of training have been divided into units as follows in order to permit those desiring a broad training to gain experience and knowledge:

Branches of Training for Upgrading

WORKER IN CLEANING DEPARTMENT

Materials—Sand, abrasives, gases, acids, misc.
Equipment—Scratch brushes, chisels, hammers, files, etc.
Operations—Cleaning, finishing, assorting, repairing, mixing, applying.

ASSISTANT TO MELTER

Materials—Pig, scrap, flux, fuels, refractories.
Equipment—Shop and its construction.
Operations—Charging, firing, drawing, repairing.

POURING

Materials—Sands, clays, blackenings, misc.
Equipment—Shop and its construction.
Operations—Lining, baking, pouring, care of ladles.

COREMAKING

Materials—Sands, binders, re-enforcements, fuels.
Equipment—Shop and its construction, coremakers'.
Operations—Mixing sands, ramming, venting, re-enforcing, baking.

MACHINE MOLDING

Materials—Sands, facings, partings, patterns, misc.
Equipment—Machines and their construction.
Operations—Tempering sands, ramming, re-enforcing, venting, finishing, setting cores, securing, pouring.

BENCH MOLDING

Materials—Sands, facings, partings, patterns, misc.
Equipment—Shop and its construction, molders'.
Operations—Tempering sands, ramming, re-enforcing, venting, finishing, setting cores, securing, pouring.

SIDE FLOOR MOLDING

Materials—Sands, facings, partings, patterns, misc.
Equipment—Shop and its construction, molders'.
Operations—Tempering sands, ramming, re-enforcing, venting, finishing, setting cores, securing, pouring.

CRANE FLOOR MOLDING

Materials—Sands, facings, partings, patterns, misc.
Equipment—Shop and its construction, molders'.
Operations—Tempering sands, ramming, re-enforcing, venting, finishing, setting cores, securing pouring.

LOAM MOLDING

Materials—Sands, facings, partings, patterns, bricks, misc.
Equipment—Shop and its construction, rigging molders'.
Operations—Laying bricks, sweeping, finishing, baking, assembling, securing, pouring basins.

ASSEMBLING

Materials—Sands, facings, chaplets, misc.
Equipment—Shop, assemblers'.
Operations—Lifting, setting cores, securing, pouring basins.

HEAT TREATING AND ANNEALING

Materials—Refractories, fuels, misc.
Equipment—Location, construction.
Operations—Charging, heating, drawing, repairing.

In instituting an upgrading system, consideration should be given to—

1. Centralization of training responsibility.
2. Definite training policy.
3. Location of training activities.
4. Competent instructor.
5. A detail study and analysis of each job in order to establish a standard time and a best method.
6. Issuance of standard practice instruction.
7. Record form, including standards of quality and quantity.
8. Follow-up system.

In conclusion, the writer suggests that this organization take a definite stand in regard to the following:

1. Extent to which apprenticeship training is essential.
2. A standard of merit and accomplishment toward which training should be directed.
3. A standard form of indentured period.
4. Branches of training.
5. Length of indentured period.
6. Character of instruction.
7. Securing co-operation of public schools and assistance through the Smith-Hughes act.
8. Hours and time of instruction.
9. A standard record form.
10. Compensation.
11. Incentive.
12. Reward to graduates.
13. The establishment of a central clearing house to gather, develop and distribute literature and information tending to develop knowledge and higher intelligence in foundry work.

The last suggestion has been submitted by Dr. Richard Moldenke, Pat Dwyer and others. Mr. Dwyer has submitted a suggestion in writing as follows:

"Instead of trying to get a competent local instructor for each plant, a feat which is neither practicable or possible, a central bureau should be established. A series of condensed papers could be prepared on every phase of standard foundry practice, each one by an acknowledged practical expert in his line. Copies of these papers would then be available for any man anywhere who wished to take advantage of them. The merits of this plan are that only the best methods would be in circulation; only those who are really in earnest would take advantage of them; and by having a competent representative body to sponsor and finance the scheme, the cost would not be excessive in any particular case."

In the final analysis the success or failure of this work will depend upon the extent to which foundries will institute and promote training in their own shops.

There is a strong tendency among foundrymen to let the other fellow do the training and a few foundries have stated that they are not bothering with apprentices because they employ only first-class molders and prefer to hire them as best they can.

If every foundryman will appreciate the fact that his experienced and trained men will do most toward the progress of the foundry and then honestly and wisely endeavor to promote such training as is best applicable to his particular foundry, a start will be made, the results of which may far surpass our expectations.

The Lubrication of Ball Bearings

Friction Characteristics—Requirements of Oils and Greases — The Use of Graphite

THE requirements of a ball bearing lubricant were discussed and an instrument designed for testing lubricants was described by its designer, H. R. Trotter of Hartford, Conn., in a paper, "The Lubrication of Ball Bearings," presented before the recent meeting of the American Society of Mechanical Engineers, New York. The device depends for its operating principle on the fact that where two surfaces are in sliding contact, a satisfactory film of oil cannot be maintained unless the surfaces are at a slight inclination to each other. It consists of a revolving element driven by a small motor, and a stationary element similar to a block used in Michell or Kingsbury bearings, with a suitable means of obtaining readings of the inclination angle of the blocks to the revolving element.

Mr. Trotter stated that independent experiments by Professor Kingsbury and Sir Charles Parsons had established the fact that with a centrally supported block, the wedge shaped film of oil was due to the change of viscosity of the lubricant when passing through the block; thus the angle which the block assumes to the rotating member gives an indication of the change of viscosity in a lubricating film when in operation. While the speaker was not certain as to the practical value of the instrument, he believed it at least a step in the right direction.

Operating Characteristics of Ball Bearings

The two cardinal points of successful sleeve-bearing operation as explained by Mr. Trotter embraced the design of such a type as will permit of the formation and preservation of an oil film, and the selection of a lubricant that will provide a film of maximum strength with a minimum of internal friction. With a ball bearing, he said, the problem is not so easily understood, but the important points to be remembered are: The coefficient of friction is practically constant throughout wide ranges of loads and speeds; metal-to-metal contact (an oil film) is only possible at very high speeds when slippage may take place; the coefficient of friction is lower in an unlubricated ball bearing (at light loads and moderate speeds).

The first point, Mr. Trotter said, is of course generally known, but the conclusion to be derived from this point has not been stated before, to his knowledge, namely, the impossibility of an oil film between balls and races. A number of curves were shown indicative of the difference in the coefficient of friction of a plain bearing and a ball bearing. Curve A showed the change of friction coefficient of a plain bearing under constant load and varying speed and indicated that a satisfactory oil film is not formed until a certain speed is reached. Curve B gave the friction coefficients of a well-made ball bearing, and showed that the friction loss of a ball bearing is practically constant throughout wide ranges of speed. If an oil film were formed between balls and races, curve B, he said, would possess the same general characteristics as curve A.

The difference between the friction coefficient of a lubricated and an unlubricated ball bearing was shown in two curves, which are reproduced herewith. This property of a ball bearing, Mr. Trotter pointed out, is not generally known and should not be used as an argument in favor of operating ball bearings without lubri-

cation. From the foregoing statement, he said, it should be evident that plain bearings and ball bearings possess such radically different characteristics that a true comparison is impossible. It naturally follows, therefore, that practically all the accumulated experience of the lubricating engineer is of little value when analyzing ball-bearing operation.

Requirements of a Ball Bearing Lubricant

"The use of a lubricant with ball bearings," he said, "is necessary to protect the highly polished surfaces of the balls and raceways, and to minimize the slight friction between the balls and the ball retainer. The small amount of friction between balls and retainer can also be minimized by careful design. The principal requirement of a ball-bearing lubricant is chemical neutrality. The lubricant used must not contain over 0.10 per cent acid or alkali. There are many commercial lubricants on the market which come within this limit, but very few are acceptable because of their tendency to develop acid with age or when operating at high temperatures.

"Most of the high-grade oils can be used with safety, but many of the lubricating greases, while suitable for general purposes, are a positive menace to successful ball-bearing operation, not because of poor material used in the manufacture of greases, but because of the lack of scientific mixing methods. The manufacturer is in no way to blame for this condition, because he is making grease for general commercial use and not for ball bearings. There are now on the market a few greases manufactured especially for ball bearings, but, with one exception, all those tested by the speaker have proven worthless and clearly indicate the maker's ignorance of the requirements.

"Experience shows that the most satisfactory lubricant for ball bearings is a highly refined mineral oil having the proper viscosity and cold test for the installation. Greases should be used only where operating conditions require viscosities greater than can be obtained with a mineral oil.

"Whenever a ball bearing is operated at high speeds, it is not advisable to run it submerged in a lubricant, and provision should be made to supply the oil from a pressure system. If such a system is not available, good results may be obtained by a large sight-feed oil cup. A few drops of oil per minute is all that is required.

"At moderate speeds a heavy oil will generally give better results than a light oil. The substitution of a heavy oil for a light oil will generally result in a decreased operating temperature. This peculiarity may be explained by the fact that when the bearing is running at the actual operating speed, less opposition is offered to the rotation of the balls by the oil because of the inertia of the oil. In addition there is less churning and frothing, with their resultant air pockets. Air pockets in a lubricant act as insulators and prevent the transmission of the heat generated to the outer casing where it can readily be dissipated."

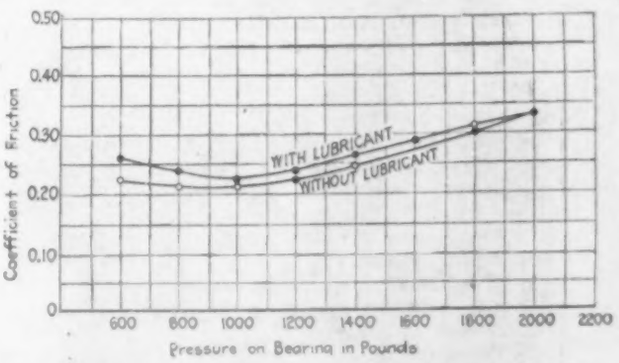
All mineral oils used on ball bearings, the speaker said, should be highly refined, filtered and contain a minimum amount of acid, alkali or sulpho compounds. In order to insure the use of such oils, Mr. Trotter suggested specifications which were given in detail. Most of the high grade mineral oils, he said, conform quite closely to the specifications as given.

Lubricating Greases for Ball Bearings

"In connection with lubricating greases," Mr. Trotter said, "the problem is more difficult. Many of the greases now on the market are entirely satisfactory for general purposes, but lack certain characteristics which experience shows to be highly important for successful ball-bearing lubrication. A large number of greases contain lime soap as thickeners, a few are of the soda-soap type, while others are a combination of both. The lime greases are valuable in that they can be used without harmful results where moisture is present. Their consistency, however, is more easily changed by heat than greases of the soda type." The speaker then gave in detail a specification for the production of grease lubricants suitable for ball bearings.

"Graphite, despite its unctuous qualities," he said, "cannot be regarded as a true lubricant. It can, however, be used with success in plain bearings as it fills in the interstices in the bearing surfaces and allows the true lubricant to operate efficiently. A modern well-made ball bearing with mirror-like finish has, however, practically no interstices in the balls and raceways. A perfectly finished ball shows no scratches when magnified 100 diameters and, furthermore, were there irregularities present, graphite would not eliminate them as there is considerable difference between the sliding action of a plain bearing and the rolling action of a ball bearing.

"Graphite, moreover, has a tendency to pack in the ball retainers and raceways, and a bearing which has been lubricated with graphite grease generally has a distinct wavy appearance in the ball paths. A recent brief test of a grease containing graphite revealed the fact that while the graphite did not pack in the raceways, and the wavy ball paths were absent, the complete raceway presented a burnished appearance quite different from that obtained by the use of ordinary



The Coefficient of Friction of a Lubricated and an Unlubricated Ball Bearing

greases. The graphite packed hard in the ball retainer and could not be removed by dipping in gasoline.

"The use of graphite in ball bearings cannot therefore be regarded as beneficial, and its application is purely a question of economics. Its use in ball-bearing automobile transmissions and rear axles is advisable only if the increased efficiency and life of the gears offset any possible harmful effect on the bearings."

The author concluded his paper by giving in detail the procedure for analyzing lime-soap greases. This included the determination of total fatty matter, total acidity, neutral saponifiable oil, mineral oil and ash content.

High Shipbuilding Record

WASHINGTON, Jan. 20.—Although in the early days of the war it was regarded as improbable that ship construction would reach the total of 6,000,000 deadweight tons annually, as planned in the program of the Shipping Board, that goal was passed in the year 1919. Complete figures for the year show that 1159 ships, totaling 6,229,323 deadweight tons, were delivered to the Shipping Board. This included 741 steel ships of 4,838,773 tons; 12 composite ships of 42,000 tons; 403 wooden ships of 1,338,650 tons and 3 concrete ships of 10,000 tons. Since the Government began to build ships in 1917 there has been a total of 2261 keels laid for ships totaling 13,055,161 tons. Of these 1975 totaling 10,892,440 tons have been launched, and 1740 totaling 9,557,444 tons have been delivered. Keels have been laid for 1637 steel ships, 18 composite ships, 594 wooden vessels and 12 concrete ships. Of these 571 wooden ships and 7 built of concrete have been launched, and 1200 steel ships, 18 composite, 519 wooden and 3 concrete ships have been delivered.

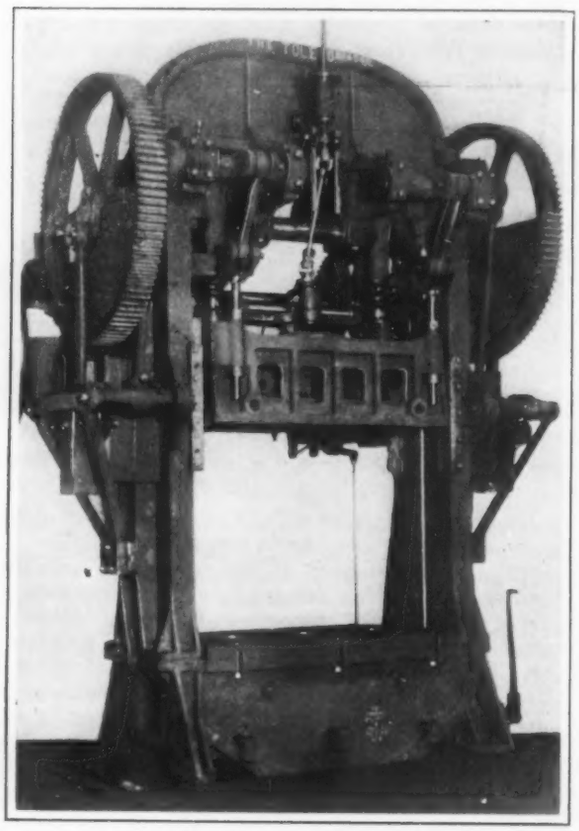
Thirty former German passenger vessels have been offered for sale by the Shipping Board as a result of the high cost of reconditioning them for passenger service after their use as troop transports. Estimates for reconditioning them showed a total cost of approximately $50,000,000. Proposals must be submitted by Jan. 20.

Drawing and Deep Stamping Presses

A new series of double-crank toggle drawing and deep stamping presses are announced by the Toledo Machine & Tool Co., Toledo, Ohio. These embody a number of improvements over those formerly made by this company and are stated to be particularly adapted for the manufacture of automobile bodies, hoods, radiators, etc., and for a large variety of other deep stamping and forming operations.

The frame consists of a base, two uprights and a crown held together by four large steel tie rods which are shrunk into place. This type of frame construction is emphasized as making the presses capable of economically operating dies for the heaviest kind of work.

The blank-holder control mechanism embodies an improved design which is essentially two complete independent units combined in one frame, and is similar



The Outboard Bearing Has Been Eliminated on This Double Toggle Press. The blank holder control mechanism is essentially two complete independent units combined in one frame

to that used in the company's single-crank toggle presses. There are two pairs of rocker shafts operated from each end, equipped with substantial bearings to withstand the blank-holding pressure. The function of the blank-holder control mechanism, it is explained, is such that it not only insures a perfect dwell of the blank-holder during the entire drawing operation, but also exerts all of the necessary power required, and wasters due to undulating or yielding of the blank-holder pressure are eliminated. The timing in relation to the other moving parts of the press, it is stated, is such as to admit of effective balancing of the entire machine so that smooth running is assured and the press is under the complete control of the operator. Very little effort, it is explained, is required to either stop or start the press at any point of the stroke. The entire blank-holder pressure is transferred direct to the frame of the press through the straightened toggles.

When desired, provision can be made for disconnecting the toggle mechanism from the blank-holder and attaching the outer slide to the inner slide, thereby converting the press into a single-action machine. This arrangement is emphasized as particularly useful when there is not sufficient work to keep the press engaged at all times on drawing operations. The presses may be furnished with power slide elevator for the convenient raising and lowering of the plunger slide. Spring pressure attachments may be fitted in the bed of these presses, thereby converting them into triple-action machines.

The method of supporting the gearing on the presses is explained as affording compactness and rigidity and as doing away with the outboard bearings, allowing free space all around the machine for ready access and for the handling of material. This is emphasized as an original feature which insures not only a rigid construction, keeping the gears in alignment, but also as affording economy in floor space. All of the presses have twin gear drive on the main shaft, protected by metal guards.

The common practice for operating the press is by an individual electric motor mounted on a special foundation or on the wall or ceiling and belted direct to the flywheel of the press.

Strength of Thermit Welded Tie Rods

The tie rods from a concrete ore dock back to an anchor wall were thermit welded by the Metal & Thermit Comporation, 120 Broadway, New York, at the plant of the Algoma Steel Corporation, Ltd., Sault Ste. Marie, Canada. A total of 39 welds were made in 13 pieces of 3¼-in. square rod, each rod being welded in three places. Before making these welds tests were made on a piece of 3¼-in. square bar which had been thermit welded, with the following results:

	Tensile Strength, Per Sq. In., in Pounds.	*Elongation in Per Cent.*
Original Bar	48,560	52.5
No. 1—Thermit Weld....	27,500	2.5
No. 2—Thermit Weld...	52,200	6.0
No. 3—Thermit Weld...	44,880	4.0

The low value obtained in Test No. 1 is explained as being due to a slight pipe in the sample which considerably reduced its tensile strength. Test No. 2 was made on an almost perfect weld and tested stronger than the original bar.

In preparing the sections for the tests, a piece of the 3¼-in. square rod 7 in. long containing the weld was cut out. This was put in a crank shaper and machined to flat surfaces on three sides, then put under power hack saw and quartered. Three of these quarters were then turned down to test pieces each having a cross sectional area of 0.7854 sq. in. or about 7½ per cent of the original bar. About 40 lb. of thermit was used to each weld and the preheating took about 2 hr. to each weld.

Screw Thread Comparator

The Hartness screw thread comparator for accurate and rapid screw gaging is described in a 46-page book with cloth cover published by Jones & Lamson Machine Co., Springfield, Vt. The machine consists of lamp house, a work holder, and lenses all mounted on a column. A bench like frame holds a tolerance chart on which the thread shadow is projected. Details of the mechanism are illustrated and numerous reproductions of screw thread shadows on the tolerance chart are given to exemplify correct and incorrect screw lead, under and over size threads, and rough and smooth thread surfaces.

The William B. Pollock Co., steel plate construction, Youngstown, Ohio, has received a contract for a complement of 50-gross ton capacity Pollock, short-pour, hot metal ladle cars, and 315-cu. ft. capacity Pollock cinder cars for the Han Yeh Ping Iron & Coal Co. of China for operation at its new blast furnaces and steel works. It is also supplying 75-ton, short-pour, hot metal ladles and cars for the two new blast furnaces of the Indian Iron & Steel Co., Calcutta, India, which two furnaces are being supplied through the office of Arthur G. McKee & Co., Cleveland. The company recently shipped 75-ton, short-pour, hot metal ladle cars and cinder cars to the Tata Iron & Steel Co., Ltd., in India.

The Manufacture of Steel Rails

Additional Tests Recommended—De-seaming and Cord Straightening — Hot Tops and Sound Steel—The Brittleness Problem

AN important paper on the steel rail problem was presented by Robert W. Hunt, president, R. W. Hunt & Co., Chicago, at the meeting last fall of the American Institute of Mining and Metallurgical Engineers. The early portion of the paper, which is entitled "The Manufacture of Steel Rails," is devoted to a sketch of the development of the formation of steel rail specifications and their application by a system of inspection as carried out by inspectors in the field. Some of the working and result of the system are discussed. An abstract of the rest of the paper follows:

The statistics covering open-hearth steel rails give the failures that have occurred in 5 yr., ending Oct. 31, 1917, on 37,862 miles of track. Forty-five per cent of this mileage comprised rails rolled under special inspection, and therefore 55 per cent was made under other conditions. The total number of failures per hundred track miles on all of the mileage reported was 31.1, while the number of failures per hundred track miles on the rails covered by special inspection was 26.6, and the number of failures per hundred track miles of those not covered by special inspection was 34.8. Thus, there was 30 per cent in favor of specially inspected rails.

Nick-and-Break Test

As each ingot is a separate and individual casting, I believe that, in addition to the tests representing the whole heat of metal, there should be some way of determining the physical character of the steel rolled from each and every ingot. As a destructive test seems to be the only way to actually ascertain that point, and as, of course, you cannot destroy all the rails, I, in 1915, installed what is known as the nick-and-break test, under which a test piece is cut from the top end of the first, or *A*, rail rolled from each ingot. This is nicked and broken, thus enabling the inspector to examine the fractures and, in case of the presence of segregation, pipe, or some other mechanical defect, to reject the rail represented by the test piece. Following such rejection, a test piece shall be cut from the bottom end of the same rail and broken; if that piece has similar defects, the second, or *B*, rail is rejected, and a piece cut from its lower end, and tested. In case of failure, the procedure is continued for the succeeding rails until a sound one has been reached. This has proved an expeditious and cheap procedure and in my judgment very satisfactory.

A large tonnage of rails made under it is in American railway tracks and a much larger tonnage in those of Canadian railways. In fact, at the present time every standard steel rail rolled in Canada, and for all of that country's roads, is so made.

Chemical Tests

As the chemical composition of the steel is a fundamental part of rail specifications, a very important point is the taking, for analysis, of the drillings representing the heats of steel from which the rails are rolled. The drillings must be taken from test ingots, and the time and manner of casting these ingots, as well as their shape, is receiving attention.

All specifications should demand that the inspector representing the purchaser should have the right to witness the taking and mixing of the drillings, from which mixture, upon his request, he is given a portion for the purpose of check analysis. As a rule this is done, but at some plants it is a subject of dispute, which should be prevented.

A few years ago there were many rail failures through what were designated as crescent-shaped breakages; that is, ruptures in the rail flanges extending from the outside inward toward the web, the broken pieces being of crescent shape. These fractures were frequently followed by complete cross-fractures of the rails, resulting in many costly and oftentimes fatal accidents. It was found that, as an almost inevitable rule, there was a longitudinal seam in the bottom of the rail flange at the point of fracture, which was directly under the web of the rail. This situation caused great anxiety and led to much discussion as to the causes of the seams or laps.

One steel company developed and established a de-seaming adjunct to their rail mill, by which the outer steel of that part of the blooms subsequently forming the heads and flanges of the rails was milled off. The works claim success from the scheme. The later adopted sections have tracker flanges and the crescent-shaped breaking trouble seemed to have become minimized; but I regret to say that during the past year, one of the prominent railroad systems has been having a large number of such failures from heavy rails. Another system encountered the same kind of defects, which, in this case, were fortunately discovered before serious damage occurred. The rails were from different steel companies; therefore, it is again a matter demanding prompt and effective action. To require all producers to establish de-seaming mills is very radical, but if that is the only way property and life can be protected from such danger, it may have to be done.

Another point of less importance, but still of prime necessity, is the milling of both ends of the rails. This has been the practice of English mills for years and some American makers mill one end of some of the rails made by them. Depending on chipping and filing for the finishing of the ends of the rails is very unsatisfactory. Milling would not only eliminate all fins resulting from the hot sawing, but positively assure squareness of ends and accuracy of lengths, all three of which are of great importance in relation to joints, a part of track maintenance that is receiving more and more attention.

Cold Straightening

Much thought and considerable experiment have been given to the betterment of the cold straightening of rails. From the time of that procedure being represented by the blows of a heavy sledge swung by a sturdy man, the practice has been a brutal one. To accomplish the semblance of the desired result, the steel has to be bent beyond its elastic limit, thus establishing strains with an ever present danger of causing actual or incipient ruptures in the metal, which may result in complete rail failures. In my judgment, it is practical to do away with cold straightening, by proper hot straightening of the rails. If, in case of uncontrollable conditions, a few rails should come from the hot beds unsuitable for use, they could, after some cold straightening, be classed as seconds and used for other than main-track purposes.

In the present practice, a rail is put under the cold press and most carefully, but brutally, punched into seeming straight line and surface. Frequently, it is later put on the ties and with equal care spiked out of a straight line into curves of varying degrees. Rails can be hot straightened without any short kinks and with lines that will permit good loading for transportation and satisfactory track laying; thus can the expense and danger of the cold straightening be avoided. There are now at least a thousand tons of rails, finished as above advocated, giving satisfactory service in the lines of several railroads having heavy traffic, and they have had over 3 years of trial. The rail makers will welcome such a departure from present practice and, I am confident, make it successful.

Hot Tops and Sound Rails

To secure sound rails it is of supreme importance to make sound ingots. Sir Robert Hadfield, in October, 1912, presented a paper before the Iron and Steel In-

stitute which attracted wide attention and much discussion. The plan is broadly designated as using a hot-top ingot, and many plans of obtaining such castings, other than directly following Sir Robert's, have been and are being successfully employed, notably, on ingots to be used in ordnance work.

As yet hot-top ingots are not used in rail making; both encouraging and disappointing experiments have been made, but I am satisfied that it is practical and will be so proved. Based on the results obtained with other than rail ingots, its success with them is bound to come. Therefore, while I am not at this time prepared to incorporate hot-top ingots in rail specifications, the time is near when it will be entirely practical to do so. It may involve a somewhat greater first cost, to be at least partly offset by saving in scrap, but if the outlay is justified when making steel to be used in destroying life, should it not be even more so when producing metal on the soundness of which human safety will so largely depend?

The threatened shortage of high-grade manganiferous ores during the late war years led to economy in the use of metallic manganese, particularly through the more general adoption of the practice of adding it to the charges in a melted condition. The results from a metallurgical viewpoint have been very satisfactory and specifications should insist on the practice.

The importance of the chemical composition of rail steel cannot be gainsaid. In former times, when acid Bessemer steel was used for rails, its composition was restricted to a large extent by the character of the original ores, it was controlled with considerable ease by the condition of the process itself. Heat after heat of fairly uniform composition was produced and, in short, the desired aim for the various ingredients of the steel was readily obtained. But basic open-hearth steel manufacture is fraught with far more difficulty for, while the initial composition of the charge does not exert so much influence, the attainment of the desired composition for the heat is dependent on so many constantly varying conditions that a wider latitude in the range for some of the different elements must be provided. The time will come when this will not be necessary and the practice of using molten additions for recarburizing enables operations on a much more consistent basis with respect to furnishing steel of the analysis desired.

The Problem of Brittleness

The most harmful physical characteristic of rail steel is, of course, brittleness. The low amount of phosphorus present in open-hearth steel renders protection against the dangers from that element and permits freer use of carbon as a hardening element. Experience has pretty well demonstrated that the safe upper limit for carbon in rail steel is approximately 0.75 per cent; and accepted practice has allowed a working range of 13 points, with the result that the lower limit of carbon has been most frequently specified as 0.59 per cent, but in some cases 0.62 or 0.63 per cent; speaking, of course, of the almost universally accepted practice of having the steel contain not over 0.04 per cent phosphorus. The problem of always making basic open-hearth steel within this range is difficult and frequently heats are cast slightly outside the limits specified.

As a means of lessening the tendency on the part of the manufacturers to protect themselves by keeping the carbon content of the metal toward the lower range, it would be well to accept not over an agreed upon small per cent of heats slightly higher in carbon than the specifications. These rails could be specially marked and shipped, so that the roads would have them by themselves and use them in places for which they would be well adapted. I think that there would be but a very small percentage of such rails produced, but the very fact that the danger of rejection from over high carbon would be eliminated would cause the steel makers to feel less restricted in their procedure. In other words, it would allow a certain elasticity which would, undoubtedly, work to the advantage of both producers and consumers; of course, for acceptance, the high-carbon steel must have successfully passed the prescribed physical tests.

Another development of great interest is the triplex processes, both on the Bessemer open-hearth electric and the Bessemer and double open-hearth plans. These are being worked out in practice and, I believe, will soon be adding much toward the production of more regular and, hence, better steel, and also better rails.

Developments in Use of Molybdenum in Alloy Steels

Not a Satisfactory Substitute for Tungsten—Its Influence on Alloy Steels—Claims of C. H. Wills

IN view of the recent agitation regarding molybdenum tool steel and the reports of Professor Arnold's supposed discovery of a super high-speed steel (THE IRON AGE, Jan. 1 and Jan. 8, 1920), the following extracts from an article, "Molybdenum and Molybdenum Steel," by W. E. Simpson, in *Mining and Scientific Press*, Dec. 20, 1919, are interesting and instructive:

During the war, when cost was of minor importance, molybdenum did enter largely into the composition of various tool steels, but diligent inquiry leads to the belief that its use for that purpose was confined to such times as the supply of tungsten fell short of requirements, and considerable doubt can be entertained as to whether at any time the resulting product really proved an unqualified commercial success. The loss by volatilization involved in converting the mineral molybdenite into the alloy ferromolybdenum is stated to be 15 per cent of the metallic content. This gives a rough idea of the extent of change in composition likely to happen during exposure to a high temperature. No records are available of these tools having been in general use for any great length of time and we must assume that the chief utility of molybdenum must lie in some other way than in the manufacture of tools.

Investigators of fifteen or twenty years ago were unanimous in their outspoken condemnation of the metal under any conditions as a steel alloy, and, so far as early day experiment went, the outlook for its commercial application was decidedly discouraging. A recent repetition of these investigations, however, has shown that the undesirable qualities imparted to the steel have been due, not to the molybdenum, but to the impurities with which ferromolybdenum was then invariably associated; in fact, the real influence of molybdenum in steel alloys is only now just beginning to be understood and future developments are likely to be of far-reaching industrial importance.

In the early stages of the war, reports were most consistent that the great German howitzers, which battered down the supposedly impregnable forts of Liège and Namur, and which were captured when on their way for similar work near Paris, owed their quality of endurance to the presence of a lining of molybdenum steel. The American Government, in order to test the value of these rumors, I am informed, caused chemical analyses to be made of the linings of two 4-in. pieces of German field artillery, and were unable to detect the presence of molybdenum. This is quite likely, and yet both reports may be perfectly correct.

During the war a feeling existed among steel metallurgists of the Allied governments that the Germans possessed information regarding certain merits of molybdenum that could be turned to military advantage. Certainly statistics have shown that, in the three years preceding the war, the whole output of Queensland (Australia), then the world's greatest producer, went to Germany. The British Government, therefore, as a matter of military necessity, bought every pound of molybdenite at sight, in order, not so much to use it themselves, but rather to prevent it from reaching the

Germans. As a result, the price rose in Norway, on account of its geographic position, to over $6 per pound.

Metallurgical research in England, during the war, showed that molybdenum, when added to certain steels, imparted not so much a hardening but rather a toughening property, which permitted the manufacture of plates possessed of great strength with comparatively little weight. The British War Department was not slow to realize that in this steel they had an ideal material for the construction of the famous tanks, and for that purpose it was used extensively, if not exclusively. I believe that the steel plates of which the tanks were manufactured contained, besides nickel and chromium, slightly in excess of one-half of 1 per cent of molybdenum. The alloy was so tough as to be unaffected by machine-gun fire at 10 yd. point-blank range. No test could have been more severe than that to which the tanks in France were subjected, and the real secret of their efficiency was the part played by molybdenum in their construction. In the United States credible report has it that molybdenum steel was used for making the crank shafts of the Liberty motor, as well as for other parts of aeroplane construction.

Apart from war uses, the discovery of the toughening properties of molybdenum has led to its commercial application in several industrial directions where increased strength without excessive weight are important factors. Noteworthy instances of useful application, so far as the mining industry is concerned, include such articles as camshafts, cams, pitmen and all parts of mining machinery where heavy duty is demanded. The applications for patents bearing on this matter are, I believe, so numerous as to give the impression that molybdenite mining is in for a "boom."

It is common knowledge that the crankshafts and many other parts of aeroplanes are made of molybdenum steel but its greatest use in the immediate future seems to be in the manufacture of steel for auto trucks, tractors and automobiles. In this connection much credit is due to the industrial research work of Child Harold Wills, so long associated with Henry Ford. He has been granted patents under dates of Sept. 3 and of Dec. 17, 1918, for certain steel alloys in which molybdenum is the all-important factor. In his specifications Mr. Wills states that "It has been impossible to obtain the super-excellent qualities of certain special steels without losing other properties absolutely essential to a commercial steel." He classes the various well-known alloys of steel for their defects and disadvantages: Vanadium for "its liability to crystallization above certain narrow temperature ranges"; nickel "although having non-crystallizing characteristics superior to those of vanadium steel, is very hard to machine after heat treatment"; manganese steels while possessing "super excellent properties, such, for example, as exceedingly high tensile strength and high elastic limit—are unworkable and most difficult, if not impossible to machine"; and chrome falls short in some respects "particularly as to crystallization and narrow range of heat treatment."

Mr. Wills then goes on to say, "It is the purpose of my present invention to provide a commercial alloy steel which at the same time has the super-excellent qualities of certain of the special steels and retains all the other characteristics necessary to bring the steel within the commercial class. I accomplish this by the use of molybdenum as an added constituent to alloy steels in fractional percentages ranging substantially from between 0 per cent to 1 per cent or a little higher."

As regards details of automobile construction, I am credibly informed that an axle of molybdenum steel has been twisted cold six times completely without showing signs of fracture. I do not know how far apart from each other were the twisting vises, as that would have some influence on the value of the test; for if these were close to each other the pressure of the jaws would naturally tend to prevent any signs of fracture from showing, but, in any case, in this matter confirmation is given to the assertion that the presence of a small quantity of molybdenum in steel undoubtedly does furnish a degree of uniform toughness that is truly remarkable.

Apart from use in the manufacture of aeroplanes and automobiles for which a steady demand can be confidently predicted, it seems to me that the scope of molybdenum steel will be extended in degree to all other steel-consuming industries, although I am not prepared to indorse the opinion of some optimists who look to it replacing, to some extent, the other well-established steel alloys, such as nickel. Even if further metallurgical research were to hold out the hope of such a possibility, its realization is unlikely, if for no other reason than that an adequate supply is not available. "The future of molybdenum," said a British steel expert to me a few weeks ago, "depends on two factors, namely, assurance of supply and price."

As to supply, no molybdenite property at present known can offer, say, 50 tons per month, whereas the nickel-bearing ore bodies are so large that during the war no difficulty was experienced in extracting from one shaft alone a total of 5000 tons of ore in one day. As a competitor of, say, nickel, I do not think that molybdenum has any possibility whatever but, as a valuable auxiliary, I believe that it will fill a most important position. Its action intensifies the excellent qualities of other important steel alloys and eliminates the imperfection with which their presence is generally associated. Special steels in the composition of which nickel, chromium, or vanadium plays an important part, are handicapped with an extremely narrow range of temperature in heat-treatment beyond which their high-grade qualities are seriously impaired. The percentage of loss from this cause is high, consequently these steels are expensive. Molybdenum is the corrective. Its range of temperature in heat treatment is great. Its function is to prevent segregation and crystallization, to promote uniformity of texture and secure a degree of toughness in steel that is always more or less lacking in the alloys of more common use. It thus exhibits the quality of the high-grade nickel or vanadium steel at a cost only slightly in excess of that of the ordinary article.

Anniversary of Lamson & Sessions Co.

The Lamson & Sessions Co., bolt and nut manufacturer, Cleveland, celebrated the fiftieth anniversary of the establishment of its business in that city with an anniversary party at the Hotel Cleveland Dec. 27. The company was started as a partnership at Mt. Carmel, Conn., in 1865 by I. P. Lamson, Thomas H. Lamson and S. W. Sessions, and moved to Cleveland in 1869, erecting a plant on the present site of the Upson Nut Co. The main building of the present plant was built in 1882. In 1885 the partnership was changed to a corporation. The original founders have passed away, but control of the company has been retained in the families. F. C. Case, the president, is the son-in-law of S. W. Sessions, and J. G. Jennings, vice-president and treasurer, the son-in-law of I. P. Lamson. Mr. Jennings and H. C. Holt, secretary, have been officers of the company since 1885. George Case, factory manager, has been with the company since 1904 and I. L. Jennings, assistant secretary, since 1906.

Three employees who have been with the company since its inception were guests of honor at the celebration. These were P. J. Gardner, superintendent, and Herman and Louis Brown, foremen. As a token of appreciation of the loyalty of these three men, the company presented each with a gold watch and chain. Of employees who attended the celebration 100 had been with the company 15 years and 60 had been with it 25 years or more. An interesting fact concerning the growth of the bolt and nut business is brought out in the statement that in 1876 the Lamson & Sessions plant, with a force of 150 men, turned out 25 per cent of the bolts and nuts made in the country. At present the plant has 500 employees.

"Securing Better Combustion" is the title of a booklet issued by the Green Engineering Co., East Chicago, Indiana. Articles deal with chain grate stokers in connection with problems arising in securing efficient combustion with fuels of the Mid-West, Western and Southwestern districts.

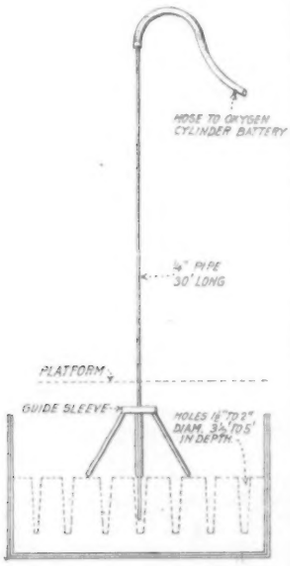
REMOVING SALAMANDERS

Holes Melted with Oxygen in Place of Drilling—Furnace Idleness Reduced

BY CHARLES C. PHELPS*

When a blast furnace is blown out, a difficult problem presents itself in connection with the removal of the residue, known as a salamander, which remains in the base of the furnace. This consists of a mixture of iron and slag. Similar salamander formations, consisting of low carbon steel and slag, accumulate in open-hearth furnaces.

These salamanders, sometimes weighing several hundred tons, are removed by blasting with dynamite. Formerly difficulty was experienced in boring the holes for blasting but recently a number of steel and iron mills have applied the oxygen burning process to this work with success. By the old method steel drill bits were employed to drill holes straight down into the salamander. Drilling usually requires from 4 to 6 hr. to penetrate to the necessary depth for blasting, that is, putting in one hole from 3½ to 5 ft. in depth. Assuming the total number of drilled holes per furnace as 36, which is an average figure, the total time consumed in drilling one salamander would amount to from 144 to 216 hr. Furthermore, as the salamander is blasted out and removed in numerous pieces, each weighing perhaps 30 or 40 tons, the drilling method holds up production for at least two or three weeks.



Oxygen Apparatus for Burning Holes in Salamander

When burning out the blasting holes with oxygen, only 8 or 10 min. are required per hole for the actual burning. The complete operation requires a little additional time for the reason that it is necessary to use two sections of pipe, and time is lost in changing connections. Nevertheless each hole is sunk in much less time than is required by the drilling method.

The first step in melting or burning the holes in the salamander is to preheat the surface. There are several ways of doing this. One of the most common is to direct an oxy-acetylene flame against the surface; as it is often located at some distance from the operators who work on scaffolding above the salamander, a long-handled blowpipe, such as the type used for staybolt cutting, is found very convenient for the purpose. Another method is to supply the necessary initial heat by placing a piece of red hot iron on the surface. A jet of high pressure oxygen, supplied through a ¼-in. iron or steel pipe, is then applied to the preheated spot or red hot iron, whereupon the surface of the salamander and the end of the pipe both start to melt or burn.

The difficulties in burning cast iron with oxygen are well known. Steel, on the contrary, burns easily for the reason that its slag has a lower melting point than the parent metal and hence flows away readily, constantly exposing fresh surfaces to the oxygen jet.

In the case of salamander melting or burning, however, the burning pipe supplies intense heat which, combined with the fact that the heat is retained in the hole, causes the cast iron to be melted or burnt and the resulting slag superheated to a fluid state. The force of the oxygen jet expels the molten slag from the hole as fast as it is formed and as the operator continues to lower the pipe into the hole the melting or burning progresses rapidly leaving an opening 1½ to 2 in. in diameter, of ample size to receive the sticks of dynamite.

In many cases, the operator is assisted in guiding the pipe into the hole by a tripod, the cap of which serves as a guide sleeve or ring to hold the pipe in a vertical position. About 60 ft. of ¼-in. pipe and about 800 cu. ft. of oxygen are consumed in making a single hole approximately 38 to 40 in. in depth.

A battery of 20 oxygen cylinders connected by a manifold, is generally employed for this work. This practice has a decided advantage over the employment of single cylinders in that there is no necessity for changing cylinders during the burning operations. It would be inefficient to permit the metal to cool while changing cylinders after having established the necessary preheating. Once started, the melting or the burning thus progresses until the bottom of the hole is reached. There is another reason for employing a battery instead of single oxygen cylinders. A too rapid discharge of the cylinder causes a freezing effect due to the rapid expansion of the gas from a pressure of nearly 2000 lb. per sq. in. to approximately atmospheric pressure. This freezing often chokes the valve, rendering the cylinder inoperative, but no trouble of this sort is experienced when cylinders are employed in batteries and discharged at a slower rate.

Burning Reduces Shut Down Period

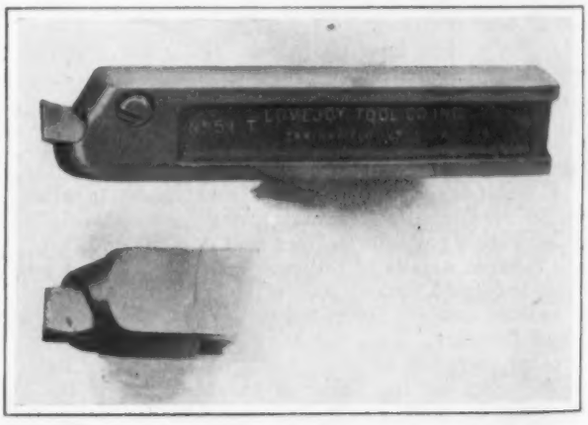
In the drilling method, labor is by far the predominating item of cost, considering the time required by the driller and helper and the blacksmith who dresses the drill bits. Nevertheless the cost of air or steam power, drill steel, lubricating oil and repair parts is by no means inconsiderable. With the oxygen burning method, the cost of oxygen and pipe are the main items and the labor cost is small in comparison with drilling labor costs. The real saving, however, is in getting the blast furnace back into production with minimum delay, for every day of idleness involves a heavy financial loss. In the case of a 400-ton furnace whose product is worth say $30 per ton, the daily output would represent $12,000. The cost of either drilling or burning the holes is small when compared with the much larger figure representing loss of production. The advantage of the oxygen process therefore is its ability to reduce the period of enforced idleness.

*Oxweld Acetylene Co., 30 East Forty-second Street, New York.

New Turning, Facing and Planer Tool

A new type of turning, facing and planer tool is being produced by the Lovejoy Tool Co., Inc., Springfield, Vt. The tool, an inserted-cutter, can be positively locked and is especially designed for use on machines that do not conveniently permit the removal of tools from the front side of the carriage, or on machines when clustering is necessary with no overhang, being entirely without interfering projections.

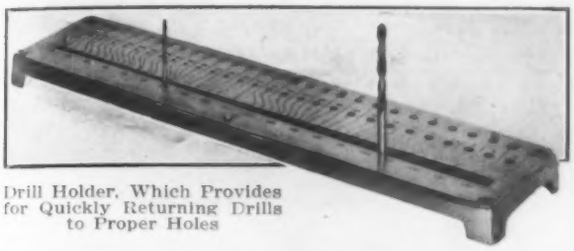
Of unusually heavy proportions, the tool has a shank size of about 1⅛ to 1 7/16 in. and a ¾-in. cutter. The cutter is placed in the holder at an angle and requires practically no grinding except on its end. A slight change in the end of the cutter converts the tool into a planing tool.



Overhang Is Eliminated in This Inserted Cutter

Drill Holder of New Design

A drill holder designed for quickly returning drills to their proper place is being marketed by Russell & Burr, 716 Land Title Building, Philadelphia. The stand contains holes for drills from Nos. 1 to 60 and a V-gage with guide lines passing from gage to holes. When through with a drill it can be slipped into the gage and will stop at one of the guide lines provided, which if followed, will bring the drill to the proper



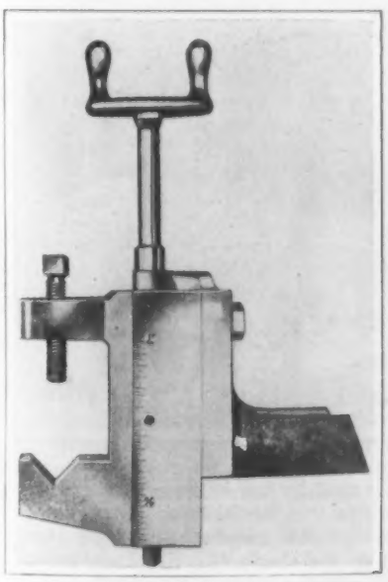
Drill Holder, Which Provides for Quickly Returning Drills to Proper Holes

hole. The drill hole thus does not have to be of accurate size as in the ordinary holder. When drilling for certain work, the piece may be slipped into the gage and proper drill selected by following the guide lines as before. The gage is also provided with decimal graduations so that both drill numbers and thousandths are known.

The stand is stamped from steel and is finished in white nickel with dark etched graduations. The device is known as the "quikbak" drill holder.

An Attachment for Lathes

The Paschall Tool Co., Long Beach, Cal., is making a lathe attachment designed to meet the requirements of machine shops that have more or less occasion to perform light milling operations, such as axle squaring, keyseating, slotting and grooving, and for use in garages, automobile repair shops and shop tool rooms. The attachment is universal in that it can be attached to any lathe that carries a compound rest, it being a simple toolpost attachment. The time required for its setting up is negligible, it being unnecessary to remove any portion of the lathe to which it is to be attached, and will handle accurately and rapidly any work ranging from ⅛ in. up to 3 in. in diameter.



Lathe Attachment for Light Milling Operations

Milling cutters of any type may be used in connection with the attachment in practically the same manner as would be on the standard milling machine, the lathe spindle or chuck holding the cutter with the work held in the attachment. By means of the compound rest swivel of the lathe and the swivel of the attachment, practically all combinations of angles to the cutter desired are obtainable. The cutters may be carried in a chuck, collet or on an arbor between centers. This method, combined with its construction, enables the cutting of keyways or slots, and practically converts any lathe into a milling machine when the attachment is set up. There is virtually no chatter when in operation, due to the fact that a perfect bearing is obtained both on the side as well as on the top of the compound rest. All automatic feeds of the lathe are available, the perpendicular or elevation feed is attained by hand. A taper and depth gage is provided. A few of the operations that may be performed just as rapidly and efficiently as on a standard miller with this attachment are: squaring an axle or shaft, cutting Woodruff and straight keyways, cutting even depth keyways in a tapered shaft, slitting flat steel, making cross slots, slotting across ends of shaft, cutting extra lengths or keyways, dovetailing ways, slides, etc., drilling and boring. In the latter work the attachment acts as a boring bar holder.

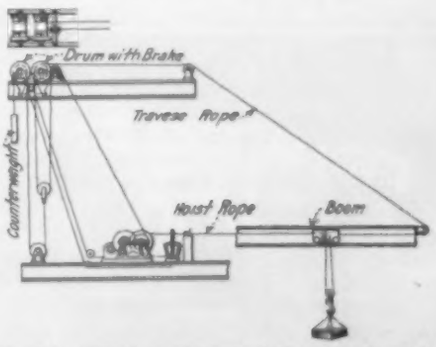
Improvements in the attachment, it is stated, have added more stock to the tool throughout, and at the same time reduced the overhang, so that tool is brought squarely and snugly against the compound rest, thereby providing rigid means of setting up the attachment on lathe.

The vise will hold up to 2½ in. The width of jaws are 4 in.; height of attachment, not including elevating screw, 6 in.; length of attachment including elevation screw, 12 in.; weight, approximately 17½ lb.

Balanced Hoist and Transporter

Hoisting equipment with a number of new features has recently been developed by Warren Travell and placed on the market by N. B. Payne & Co., 25 Church Street, New York. In this apparatus, which is applicable to installations where vertical hoisting and horizontal traversing of loads is required, a single drum is used for these two movements in place of the customary two drums. The shift between vertical and horizontal motion is accomplished by a lever which controls a pair of rope grips.

Another feature emphasized is that during the hoisting operation the entire dead load of the skip or bucket and half of the live load is balanced by a counterweight which reduces the size of hoist and motor and also effects a saving in the power required. During the operation of lowering, the motor is working to raise the counterweight, thus obtaining a control somewhat similar in effect to the well-known dynamic braking which is explained as much safer in operation than the common method of lowering with a brake. As the



For Single Line Work as Required for Handling Loads by Hook, Sling or Skip. This Hoist Uses Only One Drum. A counterweight balances the dead load of the skip and half of the live load

hoist drum is rigidly keyed to its shaft, no friction clutch is required.

This apparatus is stated to be adaptable for use on hoisting towers, cargo cranes, traveling bridges, cableways and, in general, on all hoisting apparatus in which there is a free hoist and horizontal movement of the load. For grab-bucket work, there is required for the holding line an additional drum which may be of the counterweight type, without connection to the motor.

An extensible boom has been developed for use with this balanced hoist and is explained as especially suited for use on cranes loading and unloading vessels. The boom may be extended or withdrawn in the direction of its own length and it is stated gives minimum interference with the stays, lines and wireless aerials of a vessel.

The Aetna Iron & Steel Corporation, Gary, Ind., expects to have its new sheet plant in operation by May 1.

Combination Load Lifting, Carrying and Tiering Truck

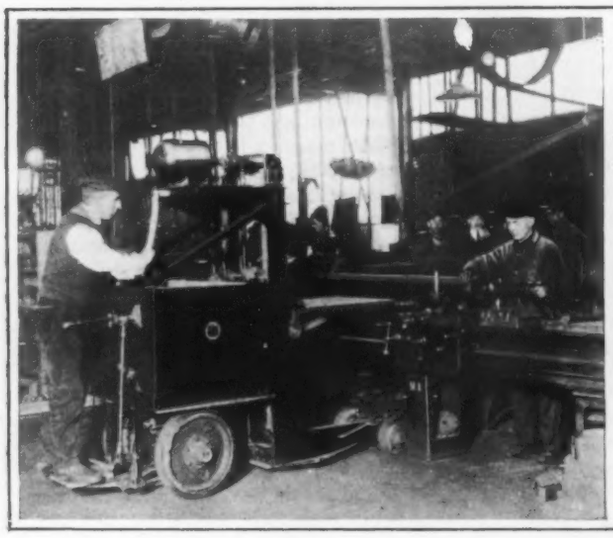
A new industrial truck which, with its own power, elevates the loads to sufficient heights to put material in box cars, stock rooms or trucks, without rehandling, has been developed by the Lakewood Engineering Co., Cleveland. Because of its ability to perform all the functions of a tiering machine as well as those of a load-carrying storage battery truck, the new machine is called the "tier-lift." It is rated to elevate with its own power a 2-ton load to a maximum height of 76 in., or to any intermediate height.

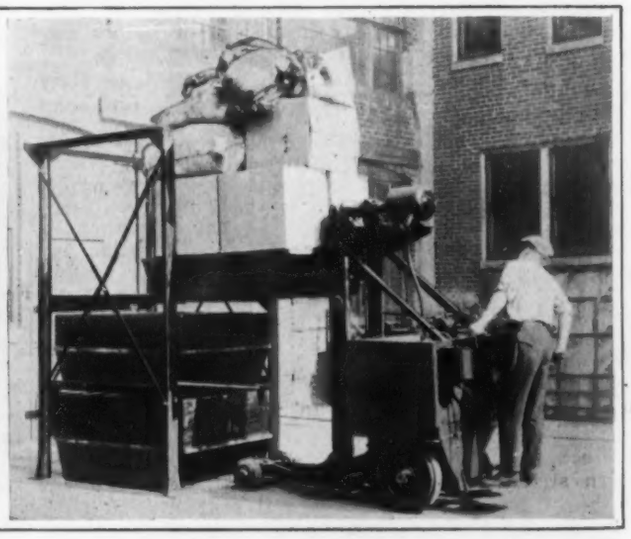
The truck, by reason of its high lift, releases the crane from this work, giving a flexible system and reducing the waste of man power to a minimum. Other advantages pointed out are as follows: Material can be economically piled to a greater height, thus increasing the storage capacity of a given floor space; storing material on skids so that rehandling of material in the storeroom is eliminated and made practical; where the material is such that it can bear the weight of loads above, the loaded platforms can be piled on top of each other, thus labor cost is reduced and material can be handled more quickly and storage of the floor space is increased. The manufacturer states that a new method of storing is made possible which permits the selection of loads from specially designed racks. With this arrangement any loaded platform in the racks may be removed without disturbing the other loads, thus giving a flexibility in the storeroom.

The same work drive is used in this truck as has been used on the company's tractors and trucks for over eight years. The 4-wheel steer permits turning in a circle 92 in. in radius, thus making easy turning in narrow aisles, or congested parts of the plant, and giving ready entrance into box cars. There are three speeds forward and three speeds reverse. The controller handle is conveniently located for operation for travel in either direction. The lifting mechanism is operated by a controller with one speed in either direction, and the lifting is done by steel worm screws. A separate motor is used to raise the load.

The load platform is carried by a cantilever type support and the load is balanced over the load carrying wheels. Ball bearings are used throughout and by a special design the friction losses in elevating and lowering the load platform, it is stated, are practically eliminated.

A Two-Ton Load Lifted to a Height of 76-in. Is the Rated Capacity of the Combination Load Carrying and Tiering Storage Battery Truck Shown in the Accompanying Illustrations. By the use of specially designed racks, the loads can be stored so that any platform can be removed without disturbing the remaining loads. A useful application of the truck is illustrated below, which shows work being lowered into position on the lathe





Shop Supervisors Study Production

The Bridgeport Brass Corporation, Bridgeport, Conn., has inaugurated a plan of training for foremen and other members of the supervisory force. A class of 73 men has been formed to pursue a course in modern production methods which comprises the study of specially-prepared text material, the solution of practical factory problems, and the discussion of this material at six bi-weekly meetings held in the plant after hours. These meetings will provide an opportunity to bring home the application of the work to the special production problems of the company. At each meeting a lecture will be delivered by an experienced production man and the lecture will be followed by a round-table discussion. The subjects covered are: (1) How to promote teamwork in the shop; (2) Handling workers by methods that make for harmony and efficiency; (3) Improved methods of factory organization; (4) Handling materials and equipment productively; (5) Reducing costs and stopping leaks; (6) Modern ideas of management. The course is conducted under the direction of the Business Training Corporation of New York, who supply the text material and the instruction service. The lectures are also given by its staff. The course is not technical but deals in basic facts and principles.

TRADE EDITORS MEET

Consider To-day's Problems, Especially Labor Troubles and the Railroad Situation

The labor problem, the shortage of railroad equipment, as well as its own technical difficulties, were discussed by the National Conference of Business Paper Editors at the Hotel Astor, New York, Jan. 16. Prominent among the speakers were editors of steel, railroad, engineering and coal journals, whose opinions were those of experts in their lines.

A very important problem was that entitled "The Influence of Shortage of Railway Equipment and Facilities on Industry," outlined by Samuel O. Dunn, editor *Railway Age*. He told how freight had increased last year by 45 per cent, whereas the increase in freight cars had been but 2 per cent. Neither has there been new mileage since 1916. When the Government secured control of the railroads only 1.8 per cent more freight was handled in 1917 than during the preceding year. In 1918 and 1919 only 1.6 per cent more freight was handled than during the preceding two years. The number of freight cars and locomotives ordered for 1920 delivery is the smallest on record, said the speaker.

"You can't increase production until you can increase transportation," Mr. Dunn emphasized forcibly. "In 1873," he continued, "the panic was due to excessive railroad construction and a lack of industrial production. We have the same conditions to-day—only reversed. I think this railroad problem is the most serious that confronts the nation to-day.

Billions Are Needed

"Our editorial staff has conservatively estimated that the railroads of the country need $6,010,000,000 in the next three years for their upbuilding. There will be a national convulsion if something isn't done. After the Government secured control statistics of car shortages by districts were issued from time to time, until those shortages were excessive, when the statistics were suppressed. Under private ownership such statistics came forth regularly."

Mr. Dunn stated requirements for the next three years to be: Freight cars, 712,000; locomotives, 13,000; new track mileage, 6000; passenger cars, 25,000; block signals, 10,800 miles. He said that the average number of passengers per car has increased about 40 per cent in the last four years.

The labor problem was discussed by A. I. Findley, THE IRON AGE, president National Conference of Business Papers; L. P. Alford, *Industrial Management;* R. Dawson Hall, *Coal Age*, secretary National Conference of Business Papers, and E. J. Mehren, *Engineering News-Record*. Industrial unrest was considered under the headings of causes affecting the individual and society as a whole, and remedies within industry and in which the public participates.

Mr. Alford outlined the history of strikes from the first important one about 400 B. C., when 20,000 workers in Athens struck because of a curtailment of food and clothing. He said that an epidemic of strikes occurred each time the standard of living was forced lower because of mounting prices. He also attributed modern strikes to the enormous growth of industry and the elimination of the personal contact between employers and workmen that formerly existed. Other reasons for unrest he named as disloyal and revolutionary propaganda, mental disease and character defects, ignorance of industrial economics, suppression of individuality, repression of normal instincts, and the motive for gain alone.

Mr. Hall conceded that wage payment should be based on the increased cost of living, but pointed to the experiences in British Columbia, where the miners were not satisfied with such a scientific wage adjustment, but demanded huge profits besides. He said that profit-sharing is all right as long as profits go up or stay even, but fails when conditions are otherwise. He said that both miners and operators are opposed to it. Mr. Hall compared the miner to the farmer, though their active seasons are reversed. However, the miner does not work overtime during his rush period, as does the farmer.

The Shop Committee Not New

Mr. Findley claimed that shop committees were not new—that James C. Bayles, one time editor of THE IRON AGE, had written an article on this subject in 1886. At that time shop committees were chosen by the unions. The speaker commented upon how the term "welfare," as applied to labor, was falling into disrepute; how what was once large-heartedness is now considered simply business efficiency. There are now six steel plants dealing with labor collectively, though the time since their adoption has been too short to gage results. Some employers have welcomed employees' representation since it relieves them of some of the responsibility. The modern plan of employee representation as adopted in the United States is much better than the old autocracy of either the unions or the employers, and is better than the Whitley councils of Great Britain.

Mr. Mehren discussed compulsion as applied to investigation and arbitration. He believed that compulsory investigation was desirable, but compulsory arbitration undesirable. He pointed to Australia with its laws for compulsory arbitration, where the workmen struck when the award of the arbitration board was not favorable to them. He commented on the recent Canadian Industrial Disputes act by which no strike can be started during the 30 days pending the attempts at settlement.

The suggestion that the next President of the United States be a business man was brought before the conference. It was suggested that he be free from political ties; that the task of running a Government is similar to that of running a business; that lawyers are but proxy business men; that George Washington, one of the most successful presidents, was a business man; that an amendment to the constitution should be passed providing for a six-year term.

Meeting of National Slag Association

Approximately 90 per cent of the tonnage of commercialized blast furnace slag was represented at the annual meeting of The National Slag Association held at the office of that organization, 933 Leader Building, Cleveland, Jan. 16. The result of the election of officers for the year 1920 follows: L. A. Beeghley, Standard Slag Co., Youngstown, Ohio, president; C. E. Ireland, Birmingham Slag Co., Birmingham, Ala., vice-president; H. J. Love, secretary-treasurer.

The executive committee will consist of the following: President L. A. Beeghley, Standard Slag Co., Youngstown, Ohio; E. H. Kuttner, Illinois Improvement & Construction Co., Chicago; F. A. Sarstedt, Cleveland Macadam Co., Cleveland; L. H. Hawblitz, France Slag Co., Toledo, Ohio; H. N. Snyder, Buffalo Slag Co., Buffalo, and C. L. McKenzie, Duquesne Slag Products Co., Pittsburgh.

Organization plans to enlarge the scope of the work of the Association were completed that will enhance the value of the technical and practical side of the material along the lines of diversified uses which have been advocated by the producers.

The object of the Association is to bring recognition to its material as a standardized concrete aggregate in all classes of construction, a superior macadamizing agent, and a satisfactory railway ballast.

At the January meeting of the Cincinnati chapter of the American Steel Treaters Society, Professor Keller, formerly of Purdue University and now with the Vanadium-Alloys Steel Co., Latrobe, Pa., delivered an address during which he demonstrated the spark method of testing. The lecture was illustrated with lantern slides showing various methods used in the heat treatment of steel. Professor Keller, who is president of the Steel Treaters' Research Society, Detroit, also gave an outline of the negotiations for an amalgamation of the two associations, a vote on which is now being taken.

HEATING PATTERN PLATES

"Sweating" Prevented by Electric Units Mounted Within Framework of the Molding Machine

BY JOHN M. STRAIT*

The production of clean, smooth castings from molds made with metal patterns depends upon there being no sticking of molding sand to the patterns when they are removed from the sand. There is a tendency for moisture to collect on the cold metal pattern from the moist sand, or for the cold plate to "sweat," during which process moisture collects on it. When this moisture collects the sand sticks to the pattern being removed from the mold, and the mold acquires a rough surface, so that when the metal is poured the casting will have a rough surface. This pattern will now have a rough surface, due to the adhering sand, so that when the next mold is made it will have a rough surface

Two Steel-clad Westinghouse Electric Heaters Are Mounted Under the Metal Pattern Plate on This Molding Machine Thus to Keep the Pattern from Gathering Moisture. The Metal Pattern Plate Is Lifted Out of Position so as to Show the Heaters

unless the pattern is cleaned off and dried. This trouble is experienced summer and winter.

The collection of moisture can be prevented by heating the pattern. The heat applied, however, must not be so great as to cause the sand in the mold to dry, as it would then crumble away and again the casting would have a rough surface. Furthermore, the heat must be applied in such a way that the pattern can be conveniently changed when desired.

The usual method of heating is by a gas flame left burning in the space underneath the pattern within the framework of the molding machine. It is difficult to keep the flame low enough so that it will not heat the pattern too much. A larger flame than necessary is, therefore, employed at some distance from the surface of application. This makes an inefficient arrangement, as most of the heat is dissipated into the surrounding space. The surrounding air becomes contaminated by the gas fumes, and in summer there is the further discomfort due to the heating of the surrounding air.

Difficulty is experienced, due to variation of gas pressure, so that at one time the pattern is too hot and at another too cold. When the pattern gets too hot it is necessary to cut off the gas, and when it has cooled down, relight and readjust the gas. In some sections there is a scarcity of gas.

A more convenient method of heating is by the use of electric heaters as shown in the accompanying illustration. Two steel-clad heaters are mounted in the space immediately below the metal pattern plate, within the framework of the molding machine. In order to use as little heat as possible, they are located just below the thickest pattern used. They are attached to supporting angles attached to the frame of the machine. A pattern of any thickness and size within the capacity of the machine may be attached to or removed from the molding machine without interference with the heaters. An asbestos insulating plate is placed just below the heaters, to prevent loss of heat due to radiation downward. The installation is made so as not to interfere in any way with the usual operation and without modification of the machine other than to drill and tap small holes for attaching the mounting angles.

For the molding machine illustrated, taking a pattern plate 16 x 11 x 2 in., there are two heaters each 13 in. long by 2¼ in. wide by ¼ in. thick. They consist of slotted ribbon alloy resisters insulated in mica troughs, the whole being encased in a heavy sheet steel casing. There is a mounting lug on each end, with holes punched in for mounting the heaters. The heater terminals are mounted on one end of the heater casing and are protected by a substantial terminal cover. The two heaters used on each machine have a total rating of 300 watts, and operate on 110 volts. The heaters are permanently connected together electrically, and connection is made to a wall receptacle convenient to the machine by a flexible heater cord having a separable attachment plug on the end.

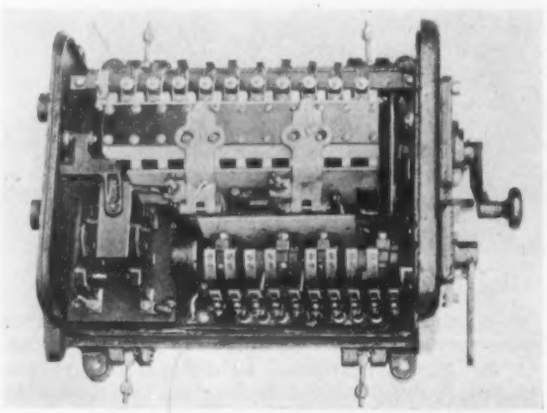
*Industrial heating section, supply department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Drum Controller for Locomotive Motors

A drum type controller for series-parallel control of two series motors is one of the new products of the Cutler-Hammer Mfg. Co., Milwaukee. This controller, which is provided with both a main cylinder and a reverse cylinder, is for use on storage battery locomotives or on trolley locomotives using 250 volts or less.

The motors are accelerated by the main cylinder, which has seven points of control. A star wheel provides an interrupted motion to the lever, so the operator readily feels the speed points. Arc barriers are provided between each contact finger, and strong magnetic blowouts prevent excessive arcing.

The reverse cylinder is positively interlocked with the main cylinder so it cannot be operated when the latter is in any but the "off" position. Two cutout switches allow either motor to be by-passed, if it becomes damaged in any way, and the locomotive operated by the other motor until repairs are made. When one



Liberal Proportion of Parts and Accessibility Are Features Emphasized for This Two-Motor Battery Locomotive Controller

cutout switch is thrown to by-pass its corresponding motor, mechanical interlocks prevent closing the other cutout switch or operating the main cylinder beyond its full series position, thus to eliminate the possibility of a short circuit.

It is emphasized by the manufacturer that the controller has its parts liberally proportioned to prevent wear and breakage, and those parts which do wear are made accessible and readily renewable.

Accommodation Arrangement to Offset Unfavorable Exchange

The Fortnightly Information Review of the American Chamber of Commerce in France, 32, rue Taitbout, Paris, has published the following communication from A. Wilzin, managing director of the E. W. Bliss Co., 100, boulevard Victor Hugo, St. Ouen-sur-Seine, suggestive of a way in which Franco-American trade may surmount the existing disparity in exchange:

• • • My customer, Mr. X, whose financial standing is first class, wishes to purchase of me, an American firm represented in Paris, $50,000 worth of goods, but considers that at 10 fr. per dollar the price in francs (500,000 fr.) is prohibitive. In most cases, if he is an active French business man, you will find that he has confidence in the ultimate improvement of the French exchange situation, and will tell me that he fully believes that the dollar will, within two years, go down to 7 fr. or less.

Building on this, I propose to him the following arrangement: "Pay me 350,000 fr. in cash—in other words, what you think you might be able to purchase the goods for two years hence—and settle for the balance (150,000 fr.) by a three-months acceptance with interest at 6 per cent. I will renew this acceptance from three months to three months during two years, and if at the end of that time the dollar has gone down to 7 fr., I will simply cancel the acceptance, and you will have simply paid me interest on the deferred amount, at such a rate as will have enabled me to carry the credit without loss. If, on the other hand, the dollar is then still at 10 fr., you pay the acceptance, and, if by chance the dollar should, at that time, be above 10 fr., let us say 11 fr., which is highly improbable, you will owe me in addition the difference, say 50,000 fr. In any case, I am sure of being able to realize the $50,000, being the amount of my bill, having in the meantime kept the equivalent in francs as an interest-bearing investment, capable of trade use over here in France."

I have been able to carry through on this basis several rather large deals, which would otherwise have been abandoned by the customer.

Thirty Foreign Nations to Send Trade Advisors To San Francisco Convention

James A. Farrell, chairman of the National Foreign Trade Council, an organization composed of 75 of the leading American merchants and manufacturers engaged in foreign trade, announces that 30 foreign nations representing Central and South America, Canada, Australasia and the Far East, will have trade advisers at the Seventh National Foreign Trade Convention, to be held at San Francisco, May 12-15, 1920, for the purpose of supplying first-hand information in regard to the markets of their respective countries.

The countries from which trade advisers are expected are as follows: Canada, Mexico, Panama, Salvador, Honduras, Costa Rica, Guatemala, Nicaragua, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, Paraguay, Uruguay, Argentine, Chile, Australia, New Zealand, Tasmania, Straits Settlement, Dutch East Indies, Indo-China, India, Philippines, Siberia, Siam.

Krupp Deficit Explained

BERLIN, GERMANY, Dec. 15.—The annual report of the Krupp Co. reveals the itemized account of the 36,000,000-mark deficit that marked the fiscal year 1919 for that famous war factory. The value of the plant shrunk to 233,100,000 marks, against 266,100,000 marks in the previous year, and the materials on hand fell from 750,300,000 marks to 234,600,000 marks. The cash resources rose from 163,100,000 marks to 182,000,000 marks. But against debts of 403,700,000 marks in 1918 it owed 626,400,000 marks in 1919.

The report says that it was the first year in the company's history to be marked by a deficit. To cover the loss of 36,000,000 marks the company used up 16,000,000 marks carried over from the preceding years' profits and 20,000,000 marks from special reserves. The report details the "peace" conversion of the big "war" plant. Part of it is now being devoted to the manufacture of gas engines, auto trucks and a long series of minor machines, for whose sale a special corporation has been formed. The company has also begun the building of locomotives and freight cars for the Prussian railroads. Besides this, it is building agricultural machinery, and if that be not enough of the beating of swords into plowshares, it is constructing projecting apparatus for "movie" theaters. As far as possible, says the report, the old employees of the company are being retained for the new work. The conversion was financed by means of the 133,000,000 marks in the reserve funds which the company had laid aside, presumably out of war profits.

A long list of increased capitalizations are also reported from the German metal working industry. The Augsburg-Nuremburg Machine Co. has raised its capital stock from 18,000,000 to 54,000,000 marks. The Saxon Cast Steel Co. at Doehlen has increased its capital from 4,000,000 to 14,000,000 marks; the Berlin Pump Mfg. Co. from 720,000 to 1,250,000 marks; the Berlin Anhalt Machine Co. from 12,000,000 to 18,000,000 marks; the Buckan Machine Co. of Magdeburg from 3,000,000 to 9,000,000 marks, and the Saengerhausen Machine Works from 100,000 marks to 3,000,000 marks.

New Plan for Handling Exports

The following is a comment in the *Boston News Bureau* issue of Jan. 13 on a foreign exchange arrangement which the Simonds Mfg. Co., Fitchburg, Mass., has put in operation to facilitate the handling of exports of Simonds saw steel products:

A working arrangement has been made between a leading firm of American exporters and its representatives in France, with a view to further the sale of American goods in France and avoid as far as possible the exchange crisis.

Goods are shipped and invoiced in dollars. The French firm does not remit dollars or francs in payment, but deposits with a local bank, for account of the American firm, an amount in francs corresponding to amount of the dollar invoice at current rate of exchange. This amount is corrected every month to correspond with fluctuations in exchange. If dollars rise, additional deposit is made to cover the difference in exchange.

The money deposited is to be transmitted when exchange rate shall have reached a level satisfactory to the importer. The agreement is for two years, and if at end of that period exchange has not fallen sufficiently to allow of transmission of the money without loss to the importers, a further agreement is to be negotiated.

The money is deposited with a bank having correspondents in the United States, and the American firm is enabled if necessary to borrow money in the United States against deposits standing to its credits in France. The French deposits bear interest, therefore the American firm incurs little or no expense in connection with its loans, as interest paid in France will offset what it may have to pay in the United States.

Wage Advances in Great Britain

WASHINGTON, Jan. 20.—The increasing extent to which wages have been advanced in industries in Great Britain is shown in reports issued on Dec. 19 by the British Ministry of Labor, which have been forwarded to the Bureau of Foreign and Domestic Commerce. Operations of the rates of wages which went into effect in November apply to 1,900,000 working people whose weekly wage has been advanced by substantially £480,000 ($2,335,900 at normal exchange) per week, or to £45,000,000 ($121,662,500) annually. This increase is the result of advances granted during the month of November only. During the first 11 months of 1919 5,250,000 working people secured increases aggregating not far short of £2,000,000 ($9,733,000) weekly, or approximately £100,000,000 ($486,650,000) per annum.

Included among those whose wages have been advanced during the first 11 months of 1919 were 118,000 people engaged in the iron and steel manufacture, whose increase in wages per week amounted to £80,800 ($393,200); 31,000 people engaged in pig iron production, whose weekly wage increase totaled £22,300 ($108,500); 1,329,000 people engaged in engineering and shipbuilding, whose total advances were £352,800 ($1,716,900), and 328,000 people engaged in other metal industries whose wage advances totaled £108,600 ($528,500).

Pittsburgh Foundrymen Visit Mesta Machine Co. Plant.

Monday afternoon, Jan. 19, a very large party of members of the Pittsburgh Foundrymen's Association paid a visit of inspection to the plant of the Mesta Machine Co., located at Mesta station, West Homestead, a few miles east of Pittsburgh. The party went on a special train and was met at the plant by officials of the company. The Mesta Machine Co. has one of the largest and most modernly equipped plant in the country for the manufacture of engines, iron and steel works equipment and other products. The buildings are all fireproof and consist of general offices, time office, laboratory, machine shop, forge shop, iron foundry, steel foundry, brass foundry, and pattern shop, and cover more than 20 acres.

The entire plant and all equipment are modern in detail, and are so arranged that all the machinery which the company makes is built complete in its own works from the raw materials. The only limit as to size and weight of equipment which the company builds is that which the railroads can handle. Steel and iron castings, weighing over 100 tons in single pieces, are regularly cast in the foundry and machined in the machine shop. A list of products of the company consists of gas and steam-blowing engines for blast furnaces, gas and steam engines for rolling mills and power plants, heavy rolling mills of all kinds, such as slabbing mills, blooming mills, plate mills, rail mills, structural mills, bar mills, sheet and tin plate mills, forging presses, shears, roll lathes, cut and machined molded gears, rolling mill pinions, heavy forgings, chilled and sand rolls, and other special equipment. A large department is provided for the production of marine work, such as line shafting, thrust bearings, rudder stocks, stern frames, etc. Many notable installations have been made by the company in the Pittsburgh, Chicago, Gary, Youngstown, Buffalo and Eastern steel producing districts. Special machinery has been produced for working of steel in plants of the United States Government.

The first place visited was the steel foundry, which contains four acid open-hearth furnaces and several cranes, ranging in capacity from 30 to 100 tons, and especially designed annealing furnaces. The steel foundry makes special castings up to 150 tons. On the chipping floor of the steel foundry were seen some of the largest castings ever made in this country. The large base center for a 14,000-ton Navy plate press, for the navy yards at Charleston, S. C., was exhibited. The casting weight of this piece was 165 tons. On the floor were the two base beams for this press, and casting weight of these was 125 tons each. The three main cylinders measured 72 in. outside, 44 in. inside and were 11 ft. 10 in. long, with the bottom 20 in. in thickness. The casting weight of these was 150,000 lb.

The Mesta Machine Co. makes all of its medium size and large castings of iron melted in seven air furnaces with a combined capacity of 200 tons. The roll foundry is the largest individual foundry in the United States, and makes iron and steel rolls from the largest to the smallest.

In the gear molding department the old method of making gears from wood patterns is not used. This department is equipped with Mesta patented gear machines on which spur gears, double helical gears, beveled gears and miter gears are molded. Its gear molding machines are different from many other types. The flask on which the mold is made revolves with the table. The head to which the tooth block is bolted moves on a heavy cross rail. This method of making gears not only has the advantage of accuracy, but also a considerable saving is effected in pattern cost and storage space.

The time office is located between the foundry and machine shop. In this building are the time office, shop cost record office, apprentice school, and a very completely equipped first-aid room and hospital on the top floor. The method employed in the time office, with a detailed description of the shop cost system, was explained to the visitors. The chemical, physical, microphotographic laboratories were visited and are modern in every respect.

The forging department was very interesting. Steam hydraulic forging presses, ranging from 1500 to 2000 tons were in operation. After leaving the machine shop the pattern shop was visited. This shop adjoins the foundry, affording close co-operation between these departments, as such co-operation results in considerable saving of time in the delivering of castings. The woodworking machinery is of the most modern type. The first floor of this department is devoted principally to the manufacturing of tooth blocks, and every pattern equipment necessary in connection with machine molding of gears, mill pinions, etc. The foundry department of the Mesta Machine Co. is one of the largest in the United States, and is especially equipped for the manufacture of iron, steel, and bronze castings. This department is served by overhead electric traveling cranes ranging in capacity from 10 to 100 tons. Also, side cranes used for carrying and setting the cores. Large reinforced concrete pits are built in the floor in which the molds are made.

During the war the Mesta Machine Co. added a ship shaft department, which is very complete in equipment. This work starts in the open-hearth steel department where the forging ingots are made. After machining the forgings and all the other parts of the ship shaft are assembled. Permanent pedestals, accurately aligned and leveled, are provided so that the shafting can be set up in its own bearings to have the bolt holes through flanges reamed.

In the gear cutting department were seen straight-spur, bevel and double helical gear cutting machines which machine teeth in gears up to 30 ft. in diameter by 6-ft. face. The Mesta Machine Co. has designed and built special gear planers for cutting double helical gears. This machine is different from that used in any other type of helical gear cutting machines. In this machine the gear is held stationary while the teeth are being cut, making the gears more accurate.

In the erecting department every machine built by the Mesta Machine Co. is erected and tested before being shipped.

The machine shop is equipped with cranes ranging from 5 to 100 tons in capacity; also, large modern machine tools for machining heavy castings and forgings, with planers up to 14 ft., boring mills up to 20 ft., lathes up to 96 in., a pit lathe that will swing up to 36 ft., gear cutters, horizontal boring mills, brass shapers, drill presses and special boring machines.

Lastly, the foundrymen visited the valve department where Mesta plate valves (Iverson patent) are assembled. These valves are used on Mesta blowing engines and air and gas compressors. By their use the air end of the blowing engine is greatly simplified.

Mesta machinery has been shipped to various countries of the world. The Japanese Imperial Steel Works has purchased Mesta plate mills, slabbing mills, structural mills, bar mills, etc., for its works in Japan. Important installations have been made in Australia, India, England, France, Italy and Canada.

After the inspection trip through the plant the visitors were taken to the dining room. Dinner was served while an orchestra composed of employees of the company rendered a musical program.

After dinner several addresses were made. F. E. Mesta, vice-president of the Mesta Machine Co., addressed the foundrymen, giving a history of the company from its beginning to the present time.

The remarkable resumption of Belgium's coal mining, the reorganization of her transportation system, the progress of her wrecked steel industry, the resurrection of the great port of Antwerp, the recovery of $600,000,000 worth of machinery stolen by Germany, the adjustment of her labor problems, and her re-entry into world finance as one of the great trading nations—these are some of the outlines in a sketch of new Belgium, entitled "Belgium's Recovery," written by D. L. Blount, an American, who until recently directed the central information office of the Belgian Ministry of Economic Affairs. The booklet has been published by the Guaranty Trust Co., 140 Broadway, New York.

President Campbell Appeals to Employees

Urges the Importance of Increasing Production and Decreasing Consumption—Traces the Effects of the Great War—The Labor World

PRESIDENT James A. Campbell has issued this statement to the 13,000 employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio:

"For the men who gave their time and risked their lives in the national service the war is over. For those of us who served as best we could, but were not called upon to make the sacrifices made by our soldiers, the war is not over. It will not be over until we have made up by economy and increased production the losses caused by the conflict.

"In America we do not feel these losses as much as they are felt in Europe, but we must bear our share of them. For four years a great part of the productive energy of our own country, as well as of the world, was devoted, not to producing things the world needs, but to destroying these things. Everything we put into the war was wasted, in an economic sense, and there is now not enough of the things we need to go around. What there is will be used by those who have money enough to pay the higher prices, and these prices will continue until the shortage has been made up. There are just two ways to do this—one to increase production, the other to decrease consumption.

Less Production

"The past year has not been used by the American people as it should have been used. Instead of greater production and more economy, there has been less production and more extravagance. Strikes and labor disputes were common and every one of these made the situation just that much worse. In the steel industry, for instance, only 29,750,000 tons of pig iron were produced in 1919, as compared with 38,422,175 tons in 1918. The production of steel fell off about 11,500,000 tons. The same thing occurred in many other industries, and the natural result is a scarcity of materials of all kinds, with correspondingly higher prices. Up to this time the country has made no progress toward replacing the material wasted in the war. This is a debt that we must pay before prices will come down and conditions be as easy as they were before the war.

Made Harder to Live

"Let us get this fact clearly in our minds. The world has never been able to produce more than it needed for decent living, even by hard and steady work. Instead of making it easier to live, the European war has made it harder. In a few cases people may be better off, but in general we are all worse off. Instead of expecting to make our living by shorter hours and less work, we shall have to work harder and longer until the vast waste caused by the war has been made up.

"There is some prospect that the next harvest may not be needed so badly in Europe as the last, and the price of foodstuffs may come down after the middle of the year, but other things will be no lower in price until the demand for them is reduced. Demand may be reduced suddenly by a panic, or slowly and gradually through people practicing economy. There is no other way.

Promise of Prosperity

"The present year promises to be one of prosperity. We have no positive assurance of this, however, and it seems likely that the steel business will be hampered considerably by a shortage of fuel and transportation, and continuous operation may not be possible. Aside from the railroad situation, there appears to be nothing to cause alarm, but it is certain that there must be a readjustment in the near future, and if this should come suddenly it will be a serious matter.

"Under such conditions everyone should make and save every dollar he can, so that if employment is affected he will not suffer. With everyone doing this the present year should be prosperous and the return of normal conditions so gradual that it will not interfere seriously with continued good times."

Baltimore Company's Firm Stand

Following a strike of 107 electrical workers at the plant of the Baltimore Dry Docks & Shipbuilding Co., Baltimore, President Holden A. Evans issued a statement in which he said that the company would take the men back only as individuals and that if necessary the plant would close down rather than give in to the strikers. At the same time he announced that all the members of the supervisory force in the mechanical departments would have to withdraw from the union.

The strike was called when the company refused to re-instate a foreman who had refused to hire a man because he was not a member of the union. After a conference it was announced by John H. Ferguson that the strikers probably would return on Jan. 19 under an agreement which was satisfactory and it was generally regarded as a victory for the company against the closed shop. But on Jan. 19 the strikers failed to return and it was announced that they would stay out until the affair was settled. It also was said that Mr. Ferguson had no right to speak for the electricians.

A Profit Sharing Distribution

Under the profit-sharing arrangement of the Hilo Varnish Corporation, Marcy and Flushing avenues, Brooklyn, by which profits in excess of 6 per cent of the capital stock are divided equally between stockholders and employees, the latter have received a payment of 21.46 per cent of their salaries in 1919. A year ago, in keeping with the increased cost of living, the payroll was increased 52 per cent over that for 1918. Had the salaries not been increased these distributions to employees would have amounted instead to 32.6 per cent. The announcement of the company's first annual profit-sharing was made by President John H. Schumann at a banquet with the employees at the Hotel Bossert, Brooklyn, Jan. 15.

Sheet Mill Wages Unchanged

Wages of sheet and tin mill operatives will continue unchanged for January and February as result of the bi-monthly examination of selected sales sheets Jan. 10 in Youngstown, Ohio. The average price of Nos. 26, 27 and 28 gage black sheets shipped by the mills in November and December was found to be $4.35 per 100 lb., the same as at the last examination. The average price on shipments of tin plate per base box during November and December was $6.90, the same as before. There has been no change at the bi-monthly examinations since last July, and wages paid employees in sheet and tin mills have likewise continued without change. James H. Nutt represented the manufacturers.

Will Continue Agitation

J. E. McCadden, district organizer at Youngstown, Ohio, for the American Federation of Labor, states that the unions will conduct an educational campaign among iron and steel workers in the Mahoning Valley, and will not cease their efforts until granted recognition by the steel companies. McCadden claims the national committee for organizing workers in the industry has made arrangements to be represented in this district for the next four years.

Compromise at Cincinnati

The molders of Cincinnati and the foundry owners have signed an agreement covering the wages to be paid

during the present year. The men demanded a flat increase of $1 per day to date from Jan. 1, and the owners offered an increase of 50 cents a day until July 1, and another 30 cents a day from that date to the end of the year. This offer the molders rejected, and at a subsequent conference a compromise was effected by which the men are to receive an increase of 50 cents commencing Feb. 1 and another 50 cents commencing Aug. 1. The agreement runs for one year. The men are now receiving $6 a day and work a 48-hr. week.

In the World of Labor

Figures compiled by the Bureau of Labor Statistics of wages and employment in the iron and steel industry for October, 1919, showed a decrease of 42.9 per cent in the number of people employed, compared to the October, 1918, figures. This is the heaviest slump of any of the 13 industries covered by the statistics. The iron and steel industry also had the heaviest decrease in the total payroll for those months.

The "Knack of Getting Ahead" is an entertaining little booklet written by Chet Williams, published by the Business Book Concern, New York. Its influence is in the way of causing employees to be more contented with their jobs and there are also some parts of the book which can hardly fail to be helpful to the progressive employer.

Pattern makers in four shops throughout Cincinnati are on strike for an increase in wages. So far none of the larger plants has been tied up, and it is possible that an amicable settlement of the difficulty will be arrived at shortly. Pattern makers are also out at Toledo and Detroit. Demands recently made by machinists employed at one of the largest machine tool plants in Cincinnati have not been acceded to by the employers. The men asked for a flat increase of 10 per cent with overtime computed each day. This the employers would not agree to, but expressed themselves as perfectly willing to raise the pay of those who, in their judgment, were entitled to it. The matter is still under negotiation, and it is unlikely that any difficulty will be experienced in arriving at a satisfactory solution.

About 1000 soldiers, the last of the Government troops, left Gary, Ind., on Jan. 12. The Gary headquarters of the union, however, will be continued to administer relief to families of men who were thrown out of work by the strike and to continue organizing activities among the workmen.

The culminating feature of one of the most successful years in the history of the Hill Clutch Co., Cleveland, was the chicken dinner served to over 300 employees in the large main dining hall, Wednesday afternoon, Dec. 31. After the dinner and cigars, with candy for the ladies, J. B. Perkins, president, made an interesting address. The rest of the afternoon was given over to a splendid program of musical and vaudeville events.

During the year the Youngstown Sheet and Tube Relief Association, composed of employees of the Youngstown Sheet & Tube Co., received 9,183 applications for membership. The association paid $58,378.15 in benefits, involving 1,897 cases.

The Empire Steel & Iron Co., Oxford, N. J., has increased the wages of all employees in its mining department 50c. a day.

The employees of the Tuthill Spring Co., Chicago, were invited to a supper to which they responded to the number of 111 given on the evening of Jan. 12 by F. H. Tuthill and W. H. Tuthill, president and vice-president of the company, to celebrate the fortieth anniversary of the business. These gentlemen formed a partnership in 1880 and have remained in active management of the company ever since.

About 400 employes of the Manufacturers' Can Co., Harrison, N. J., are out on strike due, it is said, to the proposal of the company to reduce the working day from 10 to 9 hours, with corresponding reduction in wages.

Foundrymen to Meet in October

The board of directors of the American Foundrymen's Association, at its annual meeting held in Cleveland on Tuesday, Jan. 13, voted unanimously in favor of holding the 1920 convention and exhibit of the association in Columbus the week of Oct. 4. This unanimous decision was reached as a result of a survey of the accommodations and advantages offered by the various cities which had extended invitations.

The exhibition buildings on the Ohio State Exposition Grounds will be used. In addition, adjoining buildings provide necessary accommodations for lecture halls and meeting rooms, making possible holding all the activities of the association in one place.

In respect to hotel accommodations, the board gave consideration to what Columbus could provide and would guarantee, and as a result was satisfied that the Columbus hotels could and would meet all requirements. The week of Oct. 4 was decided upon as a date when ideal weather conditions would most likely prevail.

Columbus is located centrally in the iron and steel industry of the country. A radius of 200 miles takes in all of the state of Ohio, the western part of Pennsylvania, including Pittsburgh and Allegheny, the northern half of West Virginia, the eastern half of Indiana, including Indianapolis, and the southern part of Michigan, including Detroit and the surrounding territory. A radius of 500 miles, a night's ride, takes in twenty-two states, including every city in which the conventions have been held for the past twenty-five years, with the exception of Boston.

Philadelphia Meeting of Welding Society

The American Welding Society, 33 West Thirty-ninth Street, New York, announces a meeting at Philadelphia at Witherspoon Hall, Walnut and Juniper streets, Friday evening, Jan. 23. Papers scheduled for presentation are as follows: The First Electrically Welded Towing Target, by Commander H. C. Knox, U. S. N., Norfolk Navy Yard, Portsmouth, Va.; England's Progress in Electrically Welded Ship Construction, by H. M. Hobart, consulting engineer, General Electric Co., Schenectady, N. Y.; Sound Welds, by S. W. Miller, proprietor Rochester Welding Works, Rochester, N. Y., and The Repair of the Stern Frame of the Army Transport Northern Pacific, by J. H. Deppeler, chief engineer, Metal & Thermit Corporation, New York.

The New York branch of the American Electro Platers' Society will hold its annual convention and banquet at the Broadway Central Hotel, New York, Feb. 21. An innovation will be the afternoon session at which papers of interest to manufacturers and dealers in plating supplies and equipment will be read. The banquet will be held at 7:30 in the evening. The secretary is John Burke, 110 Glen street, Brooklyn, N. Y.

The Engineers' Club of Trenton, N. J., at the annual meeting Jan. 15, elected the following officers for 1920: President, Alfred P. S. Bellis; first vice-president, C. R. Waller; second vice-president, Harry F. Harris; secretary, Joseph E. English; treasurer, James H. Johnson; directors, N. A. K. Bugbee, Alfred C. Gregory, Fred C. Carstarphen, Chas. R. Fairchild, John E. Elliott, J. W. Thompson, C. E. Whitehead.

The Worcester section of The American Society of Mechanical Engineers held a Presidents Night in the State Mutual Building, Friday evening, Jan. 16. President Miller and Past Presidents Main, Hollis and Cooley were presented to those present and later addressed the gathering in a social way. A large number of the Boston Section were guests.

The annual convention of the American Institute of Mining and Metallurgical Engineers will be held in New York, Feb. 16 to 19. The usual smoker will be held on Monday evening, Feb. 16. The usual banquet on Tuesday evening will be spread at the Waldorf-Astoria. A session on oil will be one of the features of this convention.

Coal Shortage Curtails Production at Youngstown

YOUNGSTOWN, OHIO, Jan. 20.—Because of coal shortage the Youngstown Sheet & Tube Co. has reduced finishing mill schedules to less than 50 per cent of normal. All other independents in the Mahoning Valley are curtailing. Scarcity of railroad cars is hampering deliveries of finished product, and good sized tonnages are accumulating in the yards of the leading producers.

Maintained and growing demand for all forms of finished steel is causing independent producers to predict a runaway market. Smaller makers are accepting advanced prices offered by consumers on surplus product much higher than the March 21 schedules. Consumers are offering tempting premiums for material, especially light gage sheets. Producers contend jobbers who bought at March prices and are selling at inflated quotations are making a rich profit in which they are entitled to share if the consumer insists on filling requirements. Business for the second quarter is being booked at prices to prevail at that time. The Five District Independents which export through the Consolidated Steel Corporation are far from able to meet the foreign demand despite restricted buying in some countries.

Producers anticipate domestic, South American and Oriental requirements will demand maximum production for an indefinite period, but look for continued interrupted schedules due to fuel and car shortage. An average of 80 per cent operations for the year is regarded by some as the best possible.

The President's Coal Commission

WASHINGTON, Jan. 20.—Considerable time will elapse before the present uncertainty relative to coal and coke production is removed. This situation is the result of the probability that the President's Coal Commission will take several months to complete its investigation of the wage situation. Spokesmen for both the operators and miners have made their preliminary statements to the commission, the operators criticizing the actions of the miners and the miners in turn condemning the operators and renewing their requests for large increases in wages and curtailment of working hours.

Philip H. Penna, of Indiana, speaking for the bituminous operators, said that their experience from actual knowledge of 33 years was that "collective bargaining with responsibility on one side and irresponsibility the greatest asset of the other party, is a farce." Mr. Penna insisted that their contracts are not respected by the miners, either generally or locally, and the reason is that the miners are irresponsible as an association. Mr. Penna urged that the commission recommend the enactment of legislation requiring that certain qualifications be necessary for associations organized for the purpose of collective bargaining.

Pending answers to a series of questions propounded as to the policy of the commission, the operators have withheld a definite agreement to abide by its recommendations as to wages or prices.

The miners have renewed their demand for a 60 per cent advance in wages, 6-hr. working day, time-and-half-time pay for overtime for day laborers, and double time for holiday work. The miners pledge themselves to abide by the action of the commission.

Railroad Administration Will Pay for Steel Rails

WASHINGTON, Jan. 20.—Under an arrangement made by the Railroad Administration with the railroad corporations, the former has agreed to pay for any steel rails that can be delivered before March 1 when the roads go back to their owners. The corporations agree to take all rails delivered after that date.

This agreement applies to orders recently placed by various railroad corporations. It has been estimated that the maximum tonnage that could be delivered before March 1 is 280,000 tons, but that figure is believed to be high and the expectation is that only a small quantity can be obtained before that time.

The Railroad Administration under its agreement will take any open hearth rails that can be delivered before March 1 at $47 a ton.

It has been estimated that it will be necessary for the railroads to lay 6000 miles of track during the three years after the roads are returned to their owners. This represents more than 7,000,000 gross tons of rails. Approximately 1,350,000 tons of new rails were laid in the year 1919. The Railroad Administration purchased only 241,000 tons during 1919, of which 200,000 were bought in May and 41,000 in November. This was all that was bought by the Railroad Administration throughout the period of federal control.

Second Pan-American Conference

WASHINGTON, Jan. 20.—An impetus to the development of trade relations between the United States and South American countries will be given by the second Pan-American conference which convened on Monday, and will continue throughout the week. Many prominent American business men are co-operating as members of group committees assigned to the different countries. In these group committees are such men as James A. Farrell, president of the United States Steel Corporation; Frank A. Vanderlip, of the American International Corporation; Joseph P. Grace, of W. R. Grace & Co., and Edward N. Hurley, of the Hurley Machine Co., former chairman of the Shipping Board.

All the important financial and business problems in the Pan-American countries are being taken up in the general sessions and in group committee meetings. The subjects discussed include international loans, upbuilding of rail and steamship lines, modernizing the public utilities of many Latin-American cities, building of roads and timely aid to business.

Delegates are present from nearly all the South and Central American countries, and include among their number the ministers of finance of a considerable number of the nations.

Alleged Unfair Methods

WASHINGTON, Jan. 20.—The Federal Trade Commission is stretching the law against "unfair methods of competition" to prohibit all acts which "may" lessen competition or which "may" destroy a competitor, whether intended to do so or not. Although the announcement was made in an address before the National Wholesale Dry Goods Association in New York by Commissioner William B. Colver, it is of particular interest to the steel industry because of its possible bearing on the Pittsburgh basing point controversy, for the commission has been asked to prohibit it as an "unfair method of competition." There is at present, however, no prospect of an early decision of the Pittsburgh question.

Compromise is Proposed

UNIONTOWN, PA., Jan. 20.—Trustees of J. V. Thompson have submitted a compromise agreement to West Virginia creditors calling for a settlement of their claims to the extent of 90 per cent on the principal and accrued interest. The compromise agreement has been issued to expedite the sale of the remainder of the Thompson estate to the Piedmont Coal Co. The agreement calls for the payment of the West Virginia claims from the $1,000,000 which the Piedmont company is paying for the West Virginia real estate and the creditors agree by its terms to join in a request to the United States District Court of Pittsburgh to withhold final confirmation of the sale until March 1 if that date is necessary.

Boiler Explosion at East Chicago

CHICAGO, Jan. 20.—An explosion of one of a battery of three boilers at the East Chicago Bar Iron Mill of the Interstate Iron & Steel Co. killed three men and injured about 12. The accident took place at 4.30 Monday morning, Jan. 19, and officers of the company are not able to assign any cause for it, as the boilers had undergone a rigid inspection the day before. The mill is expected to resume operation about the middle of the week.

PERSONAL

At the fortieth anniversary meeting of the firm of Rogers, Brown & Co., held at Cincinnati on Jan. 8, 9 and 10, the announcement was made that Standish Meacham, son of D. B. Meacham, had been admitted to membership in the firm. Mr. Meacham was born in St. Louis 30 years ago, but has spent practically all his life in Cincinnati, going there with his parents in 1890. Upon completion of his preparatory school course, Mr. Meacham entered Sheffield Scientific School at Yale, and graduated in 1913. One year of this course was spent at the Colorado Mining School. After graduation, Mr. Meacham entered the Cincinnati office of the firm, and before leaving for France as a Y. M. C. A. secretary in June, 1917, was assistant sales manager and also had charge of the advertising. In February, 1918, he enlisted as a private in the artillery and was wounded at Beaumont in the Toule sector. When discharged from the hospital, Mr. Meacham was attached to the Saumur Artillery School and received his commission as second lieutenant and fought with his unit at Cantigny. He was assigned to the Fifty-sixth Coast Artillery and was serving with it when the armistice was signed.

STANDISH MEACHAM

Alfred P. S. Bellis, superintendent of the insulated wire department of the John A. Roebling's Sons Co., has been elected president of the Engineers' Club of Trenton, N. J. He was graduated from Lehigh University in 1909, but became identified with the Roebling's company in 1900, serving continuously except for the four years spent in college.

A. G. Ripberger, formerly of the engineering staff of the Illinois Steel Co. at Gary, Ind., has become chief engineer for the steel and tube department of the main plant of the Timken Roller Bearing Co., Canton, Ohio.

Walter P. Chrysler, formerly president and general manager Buick Motor Co., and first vice-president in charge of operations of the General Motors Corporation, has become associated with John N. Willys as executive vice-president and general manager of the Willys Corporation, with headquarters in New York.

Charles E. Hildreth, Whitcomb-Blaisdell Tool Co., Worcester, Mass., has been elected president of the Worcester Chamber of Commerce.

Andrew Couts has resigned as superintendent in the annealing department of the Trumbull Steel Co. at Warren, Ohio, to become officially connected with the Newton Steel Co., Newton Falls, Ohio. Departmental employees presented him with a gold watch and chain.

Henry W. Glasgow, superintendent of the Nagle Steel Co., Seyfert, Pa., has resigned. He will engage in business at Los Angeles, Cal.

At the annual meeting of the Dominion Steel Corporation at Montreal, Que., Jan. 9, J. K. L. Ross resigned as a director. The directors confirmed the appointments to the newly constituted London, Eng., advisory committee of the corporation of the following: Viscount Furness, Sir William Beardmore, Hon. Sir Newton Moore, Henry Steel, Benjamin Talbot and Col. W. Grant Morden, all of whom are associated with the British interests who recently acquired 50,000 shares of the corporation's common stock.

Dexter A. Tutein has been appointed representative of E. Arthur Tutein, Inc., Thomas-vanadium pig iron, in New York, with offices at Room 1419, 25 Broad Street. He is the son of E. Arthur Tutein, who will make his headquarters in Boston, and was graduated from the Massachusetts Institute of Technology in chemical engineering. He also served in the navy during the war. W. A. Barrows, III, is the representative at Philadelphia, located at 701 Finance Building, South Penn Square. He formerly operated the blast furnace of the Thomas Iron Co. at Hellertown, Pa.

George L. Gerwig has resigned from the Republic Iron & Steel Co. sales department to make his home in California. For more than 33 years he was identified with the company and its predecessor, the Brown-Bonnell Iron Co. He served in the Chicago and Pittsburgh offices of the Republic company.

J. M. Hewitt, formerly advertising manager of the Pittsburgh Steel Co., Frick Annex, Pittsburgh, has resigned and is now connected with the Morse-International Advertising Agency, New York.

James H. Grose became president of the Brier Hill Steel Co. Jan. 10 at a special meeting of the board of directors which accepted the resignation of William A. Thomas, effective immediately. Mr. Thomas was named a member of the advisory board, taking the place made vacant by the death May 14 last of David Tod. He also continues as a director. Mr. Grose took possession of the office immediately. Mr. Thomas had originally planned to retire Jan. 27 at the annual meeting, but changed his plans in order to spend the winter in California. Mr. Grose retired Dec. 31 as district superintendent of the Carnegie Steel Co. in the Youngstown district, which position he had filled since Jan. 1, 1916. He was succeeded by I. Lamont Hughes, formerly president of the Lorain Steel Co., Johnstown, Pa. Louis N. McDonald continues as assistant district superintendent, with jurisdiction over all Carnegie plants in the district. No change in policy is contemplated by the Brier Hill Steel Co.

H. T. Henning, with Morris Weil's Son for 15 years, as acting manager of the iron and steel department, has opened offices in the Shubert Building, 250 South Broad Street, Philadelphia, to continue an iron and steel and paper stock business, under the firm name of H. T. Henning & Co., this branch of the business having been discontinued by Morris Weil's Son.

William Le Roy Emmet, designer of the Curtis steam turbine and developer of the principle of electrical propulsion of ships, has been awarded the Edison medal of 1919 for meritorious achievement in electrical science, as announced by the committee of the American Institute of Electrical Engineers, which made the award. Mr. Emmet has been a consulting engineer of the General Electric Co., Schenectady, for many years. He was graduated in 1881 from the Naval Academy. He served in the navy for years. He designed the electrical propelling machinery for the battleship New Mexico, the first warship of any nation to be so equipped. He invented several types of transformers and the oil switch now in general use in large electrical works, but has been more generally identified with the development of new methods. Mr. Emmet is a member of the American Philosophical Society, the American Institute of Engineers, the American Society of Mechanical Engineers and the Society of Naval Architects. His home is in Schenectady.

John A. Rathbone has joined the staff of the H. M. Lane Co., industrial engineer, Owen Building, Detroit, to assist in general foundry layout work and to specialize on foundry equipment arrangement and particularly on special molding machine and rigging problems. He is known to the trade as the inventor of the Rathbone multiple molding process, and was recently connected with the Wasson Piston Ring Co., Plainfield, N. J.

William R. Swan, formerly works manager of the Rust Resisting Black Finish Co., Bridgeport, Conn., and during the war stores inspector in the Ordnance Department, is building Bower-Barff furnaces for the Malleable Steel Range Mfg. Co., South Bend, Ind. Mr. Swan will superintend the "bower-barffing" of the polished range tops and flue linings for this concern.

C. H. Rose has been named comptroller of the Brier Hill Steel Co., Youngstown, Ohio, a newly created position. Mr. Rose has been secretary to President W. A.

Thomas, who recently retired. He had previously been general auditor.

C. E. Bransfield has been appointed general superintendent of the Masury, Ohio, plant of the Standard Car Construction Co. He was formerly superintendent of erection and field work of the McClintic-Marshall Co., Pittsburgh.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have elected Walter E. Meub, secretary, succeeding Leroy A. Manchester, resigned, to devote his entire attention to his duties as general attorney of the company. Mr. Meub will continue as secretary to President James A. Campbell, in which capacity he has served for three years. For five years previously he was chief clerk in the auditing department. He has been with the company 11 years. Directors have accepted the resignation of Louis J. Campbell as vice-president in charge of commercial relations. Mr. Campbell is to become president of the new Electric Alloy Steel Co., which is preparing to build a plant in Trumbull County, Ohio, for the manufacture of high-grade alloy steels. Mr. Manchester had been secretary of the corporation for two years.

E. E. Bolte has become manager of the Chicago office of Republic Creosoting Co., interior wood block floors, Indianapolis, Ind., in the place of L. S. Eifel, resigned.

C. N. Kell has been appointed assistant to the general manager of the forge department of the Duff Mfg. Co., Pittsburgh, lifting jacks. For eight months he has been assistant to the general superintendent of the company in charge of efficiency work. Mr. Kell designed the equipment of the Rock Island Arsenal for testing the recoil mechanism of the French 75-mm. gun. Later he was civilian in charge of testing the functioning of these recuperators. His previous experience included work as mechanical engineer with the Mandel Corporation, Chicago, and assistant superintendent of the Denny Tractor Co., Cedar Rapids, Ia. Mr. Kell was graduated in 1912 from the mechanical engineering department of the University of Illinois.

H. C. Barnes has joined the Allegheny Gear Works at Pittsburgh as superintendent of laboratory and metallurgical work. He is a technical graduate with more than 10 years' practical experience, having been in complete charge for years of the heat treatment for one of the largest gear manufacturers, also having supervised similar work for some years at one of the large steel mills.

The Chicago Pneumatic Tool Co., Chicago, announces the appointment of Edward A. Woodworth and C. E. Laverenz as special railroad representatives attached to the staff of manager of Western railroad sales, with headquarters at Fisher Building, Chicago. Mr. Woodworth has been secretary of the Committee on Standards, Railroad Administration. Prior to this he was with the Oxweld Railroad Service Co. and O'Malley Barre Valve Co. He was formerly chief clerk to general mechanical superintendent of the Chicago, Rock Island & Pacific Railroad and has had experience in the shops of that road as a mechanic. Mr. Laverenz was an inspector in the Ordnance Department of the Navy, and previously held positions as boilermaker and foreman of the Chicago & Northwestern and Illinois Central Railroads.

J. V. Wiesman, formerly assistant general superintendent Kokomo Steel & Wire Co., Kokomo, Ind., has been made general superintendent of that company.

D. M. Stone, for several years district sales manager for the Square D Co., First National Bank Building, Pittsburgh, has been made assistant general manager of sales, with headquarters in the main office of the concern at Detroit. In his new position Mr. Stone will also be Michigan district sales manager for the company. J. A. Jacques, formerly manager of the New York office, has been appointed to succeed Mr. Stone as district sales manager at Pittsburgh, and is now located in its offices in that city.

At the annual meeting of the Engineers' Society of Western Pennsylvania, Pittsburgh, Jan. 19, W. C. Hawley, chief engineer and general superintendent of the Penn Water Co., Wilkinsburg, Pa., was elected president; H. B. Jones, division engineer of Westinghouse Electric & Mfg. Co., vice-president; A. Stucki was re-elected treasurer, and K. F. Treschow was re-elected secretary. W. E. Tohl and J. H. Minton were elected directors.

John L. Bender, who has been sales manager for the Anderson Forge & Machine Co., Detroit, has resigned to join the C-A-S Engineering Co. of Detroit, which represents the Pollak Steel Co. in that territory.

Walter D. Monroe has been appointed general manager of sales, A. M. Castle Co., iron and steel jobber, Chicago. Mr. Monroe's experience in the steel business extends over a period of 11 years. He was first employed at South Works, Illinois Steel Co., following which he became associated with Joseph T. Ryerson & Son, in that company's Chicago sales organization. He was later in charge of the Pittsburgh office of the Ryerson company and in August, 1919, became affiliated with the A. M. Castle Co.

Albert A. Bialas, for nine years with the Columbia Steel & Shafting Co., Pittsburgh, as manager of sales, and resigned recently, has been made general agent of the Wyckoff Drawn Steel Co., general offices, Frick Building, Pittsburgh.

W. B. Peirce, general superintendent of the Buffalo Bolt Co., North Tonawanda, N. Y., for the past ten years, has resigned to take the presidency of the newly formed Peirce, Brown, Inc., who will conduct a general foundry business. The company is incorporated for $350,000 and will be located in North Tonawanda, N. Y.

W. J. Sleary, for several years purchasing agent for the Studebaker Corporation, Detroit, has resigned to become director of purchases for the Willys Corporation, with headquarters at Elizabeth, N. J.

Ray F. Beach, for more than ten years a motor truck salesman in Detroit, will have charge of the factory branch in Detroit of the Tower Motor Truck Co., Greenville, Mich.

Garth A. Dodge, formerly with the Austin Co., at its Cleveland headquarters, has recently joined Black & Decker Mfg. Co. as branch manager for the States of Ohio and Indiana and will be in charge of the Cleveland branch, 6523 Euclid Avenue.

I. F. Lehman, vice-president Blaw-Knox Co., Pittsburgh, has been elected a director of the Keystone National Bank, Pittsburgh.

Roy A. Hunt, vice-president Aluminum Co. of America, Pittsburgh, has been elected a director of the Mellon National Bank of that city.

Arthur Elliot Allen has been appointed district manager at New York for the Westinghouse Electric & Mfg. Co. to succeed Edward D. Kilburn, who has been elected vice-president and general manager of the Westinghouse Electric International Co. Mr. Allen is a native of Toronto, Canada, and received his education in England, and also in this country. In June, 1902, he entered the employ of the Westinghouse Electric & Mfg. Co. at its Newark works, subsequently being placed in charge of the test department, where he remained until 1910. He has been continually in the employ of the company in various capacities since that time.

Irving H. Jones has become associated with the machinery department of Joseph T. Ryerson & Son, Chicago, and will specialize in sales engineering work on the Ryerson line of machine tool equipment.

F. M. Cobbledick, formerly sales manager of the Union Gas Engine Co., East Oakland, has opened an office of his own in San Francisco as a manufacturers' representative. Among the specialties he handles is the Bantam Ball Bearing Co. goods.

W. S. Rogers, chairman of the board of directors of the Bantam Ball Bearing Co., Bantam, Conn., is making an extended visit to the Pacific Coast.

Stuart B. Marshall, consulting engineer and metallurgist, who formerly was general manager of the American Manganese Mfg. Co. and general superin-

tendent of the Aluminum Co. of America's North Carolina developments, recently at Roanoke, Va., now has his headquarters in Washington.

Paul R. Beardsley, secretary and treasurer Muskegon Piston Ring Co., has been elected mayor of Muskegon, Mich.

C. J. Sturgeon, formerly of the machinery sales department, Pattison Supply Co., Cleveland, has been appointed district sales manager of the Kearney & Trecker Co., Milwaukee, in the Cleveland territory. This company will open a storeroom for the display of its milling machines and for carrying a stock of its milling cutters and other small tools in the Perry-Payne Building after Feb. 1.

Herbert F. Topp, of the Cincinnati Office of Crocker Brothers, New York, has been made a junior partner of the firm. Charles H. Newcomb of the Philadelphia office and J. Bently Cueman of the New York office have also been made junior partners.

H. E. Hayward of the Link-Belt Co. was elected president of the Steel Treating Research Society, at a banquet at the Chamber of Commerce, Indianapolis. R. Desner of the Diamond Chain and Mfg. Co. was elected vice-president. The society is entering its second year. George Desautels of the Imperial Drop Forge Co., piloted it through the first year, as president. The Indianapolis branch has a membership of 120. Prof. John Keller, the first vice-president of the Indianapolis branch, is now president of the national society.

OBITUARY

E. FRED WOOD, formerly vice-president of the International Nickel Co., whose death was mentioned in THE IRON AGE Jan. 8, was born in Milwaukee on Aug. 28, 1858, and attended the University of Michigan. After leaving college Mr. Wood studied metallurgy and made extensive trips through the western mining camps. He later entered the employ of the Carnegie Steel Co. and rapidly rose to the position of assistant general superintendent of the Homestead plant. During the big strike, when Mr. Frick was shot, Mr. Wood was in entire charge of the plant. He was looked upon by Mr. Carnegie and his associates as one of the valuable men of the organization and was one of the so-called "Carnegie Veteran Associates." He joined the International Nickel Co. upon its organization, becoming first vice-president and a member of the board of directors and of its executive committee, and he was an important factor in developing the mining, smelting and refining business of the company. When the United States entered the world war Mr. Wood resigned his official connection with the International Nickel Co. to become a member of the Committee on Production of the War Industries Board, of which committee Samuel Vauclain, president of the Baltimore Locomotive Works, was chairman. Mr. Wood served continuously on this board during the entire period of the war without compensation. Mr. Wood was a man of great learning in his profession and of a wonderful memory. He was keenly interested in traveling, and had the unique distinction of having traveled around the world twice in one year. He was a member of the University of Michigan Club, the Automobile Club, the New York Athletic Club, the Society for Electro-Chemical Engineers and of the Railroad Club.

RICHARD C. MACLAURIN, president of the Massachusetts Institute of Technology, died at his home in Boston, Jan. 15, of pneumonia. He was born in 1870 and was elected to the presidency of the Massachusetts Institute of Technology in the autumn of 1908. His earlier education was obtained in New Zealand and he entered Cambridge University, England, in 1892. In 1898 he accepted the professorship of mathematics in the University of New Zealand. In 1907 he went to Columbia University as professor of mathematical physics. In November of the following year he was chosen to succeed Henry S. Pritchett, who had retired as president of the Massachusetts Institute to become chairman of the Carnegie Foundation.

W. M. DILLON, president Northwestern Barb Wire Co., Sterling, Ill., died at his home in that city on Jan. 12, after an illness of about three months. Mr. Dillon was 77 years old, having been born in Zanesville, Ohio, July 2, 1842, and was a veteran of the Civil War. He started the manufacture of barbed wire in 1878, organizing the Northwestern Barb Wire Co. In 1892 he organized with J. Wool Griswold, Troy, N. Y., the Dillon-Griswold Wire Co., and was president of this company until 1902. From that time until 1912 he continued as president of the Northwestern Barb Wire Co. He then purchased the Dillon-Griswold plant, combining both companies under the name of the Northwestern Barb Wire Co., and remained president of this company until his death.

JOHN F. DODGE, aged 54, one of the Dodge brothers, automobile manufacturers of Detroit, died of pneumonia and influenza at the Ritz-Carlton Hotel, New York, Jan. 14. Mr. Dodge was in New York with his brother to attend the automobile show. He was born in Niles, Mich., the son of a machinist and iron worker. After completing public school, he served an apprenticeship in a machine shop and in 1886 moved to Detroit. Associated with his brother, he opened a machine shop and began the manufacture of automobile parts in 1901. In the same year, the brothers were approached by Henry Ford and took a $5000 interest in the Ford enterprise. In July, 1919, Mr. Dodge sold his interest in the Ford company for $12,500,000.

JOHN A. MEAD, president Howe Scale Co., New York and Rutland, Vt., and prominently associated with other industrial and financial institutions, died at his home in Rutland, Vt., Jan. 12, aged 78 years. Mr. Mead was governor of Vermont from 1910 to 1912, was the first mayor of Rutland, a soldier in the Civil War and was a trustee of Middlebury College, from which he was graduated in 1864.

MAJOR EDWARD T. WALSH, 48, a construction engineer, who for the last two years served on the Government salvage board, with headquarters at Bridgeport, Conn., died Jan. 13 at his home in Plainfield, N. J. He was born in South Orange and had lived in Plainfield for 10 years. He was a member of the American Society of Mechanical Engineers.

CHARLES R. DALLAS, formerly with the firm of Moorhead-McCleane Co., operating the Soho Iron and Steel Works at Pittsburgh, died in that city on Jan. 12. In his later years Mr. Dallas was with the Credit Men's Association of Pittsburgh, in the adjusting department.

JOHN P. T. KEYS, superintendent of the plant of the Pittsburgh Seamless Tube Co., Beaver Falls, Pa., died at his home in Rochester, Pa., Jan. 8, of pneumonia. He was a native of Brockwayville, Pa., but had resided in Rochester during the past 15 years.

JOHN W. UPTERGRAFF, general foreman of the maintenance department of the Westinghouse Electric & Mfg. Co., died at his home in Pittsburgh, Jan 13.

The Director of Sales of the War Department is offering for sale by negotiation approximately 980,000 lb. of steel, located at Dodge Bros. plant, No. 3, at Detroit. Bids for this steel are being invited by the District Ordnance Office at Detroit. Offers for the material or any part of it are being accepted by letter or telegram. Included in the material is flat, round, square and hexagon cold-rolled stock; flat, round and square machine steel; round and flat screw stock; hot-rolled rounds, and round forging steel in various sizes—which are mostly commercial grades.

The Electric Furnace Association, Niagara Falls, N. Y., has recently issued a pamphlet, "Products of the Electric Furnace," which aims to show the superior qualities of electric furnace steel. Chemical and physical properties of various steels are cited and data on production and furnaces in operation are included.

SHORT TRADE ITEMS

The Williams Tool Co., Erie, Pa., has been sold to the Williams Tool Corporation, which has been financed by Eastern interests which were represented in the transaction by Horace W. Davis, of New York. John Jordan, Jr., retires from the management of the company, but will continue as director and C. F. Williams, engineer and superintendent, will retain his connections with the company. It is stated that the capacity of the plant, which manufactures pipe threading machines, will be largely increased.

The E. A. Kinsey Co., Cincinnati, has been appointed agent of Millholland turret lathes and screw machines for southern Ohio, Kentucky, Tennessee, western West Virginia and the greater part of Indiana. The company will carry Millholland turret lathes and screw machines in stock in both Cincinnati and Indianapolis display rooms.

The Champion Engineering & Supply Co., Inc., industrial engineer, 21 Park Row, New York, is interested in the purchase of a floating drydock suitable for vessels of about 5000 tons, either new or second hand.

The Oakland Motor Car Co., Pontiac, Mich., expects to have completed by July 1 extensive plant additions costing $3,000,000 and including three new factory units and an administration building.

The Springfield, Mass., Chamber of Commerce is negotiating with the Northern Ball Bearing Co. of Sweden to locate in that city. Two representatives of the company already have visited prospective sites there and the president is expected within a short time. The concern desires a 20-acre site, and if it locates in Springfield will give employment to several hundred men.

A new carbide plant, to be operated by water power, is being designed by W. E. Moore & Co., engineers, Pittsburgh, for the Farmers' Standard Carbide Co., Freydenburgh Falls, N. Y. A 46-ft. fall of the Saranac River will be developed to a total capacity of 3700 hp., by means of horizontal turbines and electric generators. A new Moore carbide furnace is being installed. A complete outfit of crushing, sizing machinery, together with all the detail machinery necessary to make the cans, including the laboratory outfit, is being designed for early installation. The president of this company is G. A. Stromblad, who is understood to have interested sufficient consumers of carbide to insure a market for his own output.

The Vonnegut Machinery Co., machinery and mill supply dealer, 43 South Meridian Street, Indianapolis, has let contracts for a two-story and basement reinforced-concrete building, 100 x 300 ft., to cost $300,000. It will be located at 19 West South Street, opposite the Union Station. The first floor and basement will be used for office, display floor and storage for its machine tool and machinery accessory lines, as well as a machine shop and storage for the used machinery department.

Dissolution has been made of the merged companies of Rownson, Drew & Clydesdale, Inc., and W. J. Crouch Co., Inc., iron and steel exporters, which were united Sept. 1, 1918, and had head offices at 68 William Street, New York. The latter company has passed out of existence and Rownson, Drew & Clydesdale, Inc., will continue business at its new quarters at 80 Wall Street.

The Keller Pneumatic Tool Co., Chicago, has been awarded the contract to supply the navy yards with all their requirements in pneumatic riveters, chippers, scaling hammers and holders-on for the fiscal year. The first order was for 3496 tools, divided as follows: Riveters 881, chippers 1428, scalers 896, holders-on 291. Additions since the original order was placed brings the present total to approximately 4000 Keller master tools. The bulk of the order was shipped promptly upon receipt of the confirmation. W. H. Woody, division manager at Washington for the company, conducted the exhaustive competitive tests demanded by the navy yard experts, the results of these tests being considered of greater importance than price in awarding the contract.

The Aetna Foundry & Machine Co., Warren, Ohio, has been awarded a contract for four 48-in. sheet galvanizing machines by the Superior Sheet Steel Co., which is building an eight-mill plant at Canton, Ohio. The Aetna company was recently reorganized. It is announced Victor E. Rehr will remain as general manager.

The Struthers Furnace Co., Cleveland, operating a 500-ton stack, Anna furnace at Strutners, Mahoning County, is to build a slag crushing plant during the year that will represent nearly a million dollars' investment. It will reduce for commercial availability the slag output of the stack.

A new department is to be added to the Sharon, Pa., plant of the National Malleable Castings Co. that will afford employment to 150 men. The plans provide for two new buildings, each 50 x 350. The new department will manufacture anchor chains, a product turned out in the Cleveland plant during the war. The Sharon works has been used in producing railroad car equipment.

The properties of the Standard Iron Co., Goodrich, Tenn., which were purchased by the Bon Air Coal & Iron Corporation, include Goodrich blast furnace and Aetna and Nunnelly iron mines. The Bon Air Coal & Iron Corporation has been operating these various properties since Dec. 27, 1919.

Gueret Jacks & Partners, Inc., 52 Broadway, New York, represented by F. W. T. Amis, is in the market for 20,000 tons of billets and 20,000 tons of skelp for export.

The Inland Steel Co., Indiana Harbor, Ind., has practically completed the reconstruction of one-third of its coke ovens and will fire them about Feb. 1. During the past year the entire by-products plant, consisting of 130 ovens, has been rebuilt, the ovens which are about to go in being the last to be overhauled.

Edgar Allen & Co., Ltd., steel manufacturer, Sheffield, England, and Chicago, Ill., has been incorporated as an American company with the following officers: J. C. Ward, president; G. R. Bennett, vice-president and general manager; F. C. Leiferman, secretary and treasurer.

The National Association of Purchasing Agents, 25 Beaver Street, New York, announces that the committee on standardization has been unable to agree on a recommendation of one size only for all catalogs intended for purchasing agents, in order to facilitate filing. It has been decided by the committee to recommend that all catalogs be one of three standard sizes, 6x9, 7½x10⅝ or 8x11.

The United States Electro Galvanizing Co. and the National Galvanizing & Plating Equipment Corporation announce a consolidation under the name and organization of the former to manufacture the full line of automatic apparatus for cleaning, plating and electro galvanizing formerly manufactured by the companies separately. Offices of the company are at 52 Broadway, New York.

The Spanish Gear Mfg. Co., recently formed with capital stock of $100,000, has increased its capitalization to $150,000. A site has been obtained and the building will be completed about March 1. This plant is to be equipped with American machinery, purchased by the American Machinery Syndicate, Inc., 35 West Thirty-ninth Street, New York.

The Bristol Brass Co., Bristol, Conn., has changed its name to the Bristol Brass Corporation of the same city.

The Acme Steel Goods Co., Riverdale, Ill., has adopted a three 8-hr. shift day.

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EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

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Economics of Exports

By reason of insufficient attention being given to the subject, misconceptions remain quite general as to the economic status of merchandise exports. The entire situation is completely changed, and there are two fallacies: One, that there is the same need for export trade as before the war; the other, that the change makes it that no exports at all are needed. Before the war the exportation of any commodity was advantageous to the country as a whole because it helped us to pay our debts, including, for instance, transportation charges due to foreign shipowners and interest and dividends due to foreign holders of our securities. The unseen balance of trade was against us and anything that helped overcome that unfavorable balance was an advantage. Now the condition is reversed, the unseen balance being in our favor. It is wrong to assume, however, that because formerly any exportation of commodities was advantageous, now any exportation is disadvantageous.

The public has not been educated to the new order of things, but greatly needs to be educated. If there were complete silence on the part of writers and speakers, the situation would be better than it is, for then men would be forced to think for themselves. As it is, there has been a great mass of talk to the effect that we should export, without there being the proper explanations as to what we should export. The old habit of thought has been carelessly permitted to survive, that any exportation is good. There was a time when that was true. It is not true now. There must be discrimination. It is a disservice to the public for speakers and writers to refer so much to exports in general terms and not particularize. It is a disservice in that the generalities preached are untrue and it is a disservice in that when men can see that they are untrue they are likely to lose confidence in the whole preachment.

These generalizations tend to create the impression that each industry, or any industry, needs an export trade in order to attain its greatest prosperity, and that is not true. There is also created the impression that export trade has comprised and must comprise a large part of our industrial activity, and that is distinctly untrue. Figures measuring the export trade are available and prove impressive, while figures representing the total of our industrial activity are not available. Opportunity is not afforded to make the comparison, and the export trade appears in larger proportion than it should.

If an export trade is in itself advantageous to a commercial enterprise, one would find the enterprises that export more prosperous than those that do not. In the past ten years the manufacture of automobiles has been much more profitable than the furnishing of rail transportation service, but the reason is not that automobiles are exported and transportation service cannot be. The manufacture of steel is to-day more profitable than the furnishing of electric current by public service corporations, but the reason is not that steel is exported while the electric light companies cannot export their product. Wheat can be exported and lettuce cannot, but it does not follow that wheat growing is more profitable than lettuce growing. Brick can be exported and real estate cannot, but it has not been found that consequently manufacturing brick is more profitable than investing in real estate.

The lack of specific teaching on this subject of export trade and the vast amount of generalization facilely indulged in is particularly deplorable at the present time, when our export trade is shaped by the temporary and dire necessities of other countries much more than by the stable world economic condition that must come eventually. What is done now is no criterion as to what will be done in future, and there should be careful study and education as to what international trade the economic conditions of the future will justify.

It is not sufficient to trust in letting conditions take their course. The world's commodity markets are not brought to a clearing house, where the most anxious buyer bids the highest price and gets the goods and the most needy seller quotes the lowest price and effects the sale. The New York Stock Exchange, with its wire communications throughout the country, is a good example of such an institution, but the commodities of the world do not have it. There may be goods that Italy can well produce and the United States can well afford to buy, and other goods that Brazil can well afford to buy and the United States is fitted to produce, but the parties are not brought instantly together,

as buyers and sellers are at the stock exchange. There must be study and acquaintanceship, involving time.

With the unseen trade balance of the United States more in our favor now than before the war it was against us, exports are not advantageous just because they are exports. Certain exports will be advantageous and certain imports will be advantageous, and the duty of furnishing specific information devolves first upon those who are preaching foreign trade.

Electricity in Heat Treatment

The strides which have been made in electric devices for heat treating and annealing steel in various forms is one of the outstanding features of recent progress. Only a few years ago dependence was mainly on coal or coke. Regulation and uniform distribution of the temperature, even if pyrometers were used, was difficult. Contamination of the product with scale and sulphur has often also been a disadvantage.

The attainment of the exact critical temperature has always been recognized as a desideratum. The use of electricity has helped materially in this direction. Apparatus is now in use in which castings and forgings are not only brought to the correct temperature electrically, with close regulation also of both quenching and drawing, but the entire procedure is carried out automatically. Even sheet and strip steel are being annealed in electric furnaces with discoloration or loss from scale claimed to be at a minimum. It is evident that the use of electricity in the annealing of steel castings is highly dependable to say the least.

The foregoing refers to the application of electricity as a source of exterior heat. When the transference of the current can be accomplished by passing it through the material itself there are apparently several superior advantages. It has been demonstrated that material which it was practically impossible to heat treat and thus greatly to enhance its properties can now be rendered extremely valuable by the heat of its own electrical resistance. Not only can tubing and similar products be heat treated without injuring their shape, but the properties are found to surpass in some cases the limits theoretically expected. There promises to be a wide field for the application of this process to tubing for airplanes and automobiles where the utmost in strength and reliability is of prime importance. In addition there is also the consideration that not only are pyrometers and refractories almost unnecessary but defects in the material are made easy of detection as the current traverses it and the critical temperature is located automatically.

Whether the latter phase of electric heat treatment can be applied to steel rails or not seems to largely depend on the solution of the electrical problems. Experiments made on a small scale demonstrate that certain important advantages may be realized if this problem can be commercially solved.

The growing importance of Japan as a factor in international trade is afforded by data recently published. The peak of the imports from Japan into this country during the 11 fiscal years from 1909 to 1919 (June 30 of one year to June 30 of the next), was in 1919, when the total was $303,993,041. The 1919 figures compare with $107,355,897 in the fiscal year of 1914. Raw silk constituted nearly 60 per cent of the total. As to exports from the United States to Japan, these had for 10 years been much less than the imports until last year, when for the fiscal year ended June 30 they were valued at $326,462,269. Of these, steel products constituted nearly one-fifth, with steel plates alone over $25,000,000. Five years ago American steel exports to Japan were of relatively little magnitude. The almost even balance of exports and imports between the two countries is noteworthy.

World Tin Plate Demand and Prices

One of the features of the American export movement in 1919 has been the foreign demand for tin plate. While this was abnormally large during the war, it has receded but very little in the 12 months since the cessation of hostilities on the signing of the armistice and it is still many times the pre-war movement. To Nov. 1, 1919, our exports of tin plate had been 170,200 gross tons or about three times what they were in all of 1913 when the outgo was only 57,800 tons. The total for 1919 will probably prove to be 205,000 tons, so that, at the present rate of British exports, the American exports will not be far from the British total. In 1913 the British tin plate exports were over five times the American.

Interesting details of the American 1919 tin plate movement are the heavy exports to Japan and South America. To Nov. 1, 1919, Japan had taken 30,600 tons, as contrasted with only 227 tons in all of 1913. Japan took 28,200 tons of British tin plate in 1913. The Argentine and Brazil had taken from the United States 36,500 tons of tin plate up to Nov. 1, last year, as against 2857 tons in all of 1913. The British foreign trade in tin plate, while advancing very rapidly has not reached its pre-war level. The 1919 movement to Dec. 1 was at the rate of 23,400 tons per month against 41,200 tons per month in 1913.

It is interesting to compare the course of prices in the two countries. Before the war or in January, 1913, American tin plates were quoted at $3.60 base per 100-pound box. To-day the nominal quotation is $7 per box, base, with $8 to $8.50 obtained for export. Before the war, 14 shillings per box was a high price for the British product. During the war the value was fixed at 32s 6d, but later restrictions were removed with an immediate advance of 2s 6d in the basis price. Since Jan. 1, 1919, the British market has advanced almost constantly until at the end of the year the quotation was 46s 6d. Our cables this month report a run-away market with quotations as high as 62s and makers sold up for first half and with consumers bidding against each other. At the present rate of exchange, this means over $11 per box, as compared with a much lower American price. At normal exchange British plates would be worth over $14 per box.

It is no longer suggested, says the London *Ironmonger*, that increases in costs of labor, raw material and other items in production are accountable for this rise. The plain fact is that the world's

demand has altogether outrun the supply, owing in part to the failure of the Welsh tin plate workers to maintain their pre-war output. Certain it is that British economic and industrial conditions are not favorable to a heavy increase in production or a lowering of costs. A striking fact in this connection is the advance in London in tin alone in the last ten weeks of nearly £100 per ton.

Although the American tin plate industry has attained in the last year to a commanding position in foreign trade and although industrial conditions in Great Britain show little tendency as yet to become normal, there are those who contend that ultimately the Welsh tin plate industry will resume its former dominating position. To do this it must again furnish close to nine-tenths of the world's needs. Japan meanwhile promises to be no small producer of this material and keen worldwide competition is apparently in prospect.

Helping Employees to Save

The Liberty Loan campaigns taught the lesson of thrift as nothing else has ever done, especially among those hundreds of thousands who had never saved at all or only in a desultory way. They had brought home to them the cumulative effect of a little money laid aside each week. Many employers, realizing the benefits which have come to the people with the Liberty bond and the thrift stamp, are trying to perpetuate the habit.

The effort is taking various forms. Financing of home building is one of them and is being extended widely. The opportunity to buy the stock of the employing company on easy payments is another. And there are bond-buying systems which, it is said, have been used advantageously.

The Crompton & Knowles Loom Works, Worcester, Mass., has evolved a notably simple method and one in which all of its 1500 workers may participate to advantage. The company has procured the cooperation of the savings banks of the city, so that it acts merely as between the employee and the bank. Any worker who so desires may fill out a card requesting the company to hold out from his or her wages a given sum per week and deposit it with a savings bank, the employee to designate the bank preferred. On the succeeding payday the company causes the money to be taken to the bank and deposited, and in exchange a regulation bankbook is issued in the name of the employee. It is exactly as if he went himself to the bank and made the deposit. The bankbook is retained by the office and each week is taken to the bank by the company's agent and another deposit credited in it. The employee receives in his pay envelope each week a statement of the amount of the deposits to date, with interest added as it accumulates.

In Massachusetts hereafter, under a new statute, a bank may put money at interest monthly instead of quarterly as formerly, and all of them plan to do this, so that employees' money will average to earn more than it did. Under this thrift system, if at any time an employee wishes to make a withdrawal from the bank, or should wish to deposit money other than that subtracted from his pay, he is permitted to take his book from the office without notice. When the transaction is completed he may return the bankbook to the office and his saving will be resumed. A large proportion of the 1500 workers have availed themselves of the opportunity to be thrifty.

CORRESPONDENCE

Foreign Holidays An Impediment to Production

To the Editor: There is room for only one calendar in America.

Most folks will say, "There is only one calendar observed in America and that is the Gregorian calendar." Why then say there is room for only one calendar in America?

It is said that America is the melting pot of the world, and rightly so, for when you look around you can see a score or more different nationalities in a single community. Russians, Slovaks, Ukranians, Poles, Hungarians and some of the other nationalities follow the Julian calendar, and we have permitted this to be carried on until America is getting as "holiday poor" as Russia.

The Julian Christmas, New Year and Easter come thirteen days after the American holidays, and with the other foreign festive holidays that are being celebrated "any old day" we have as many as thirty to forty holidays in some localities. In large industries and in the coal mines where a dozen or more nationalities are working together, it interferes greatly with production.

Every employer realizes that it is not only the production of the men who lay off to celebrate these holidays that is lost, but it also throws many others out of work. In the iron and steel mills, if the furnace men are off the entire mill must close down. In the foundries, if the cupola men are off, the entire foundry is unable to work; and this is true in nearly every industry where one operation depends on the other to make a complete cycle of production.

As the war progressed, and America entered it, every effort was put forth to Americanize the foreign born who are living in America, and prove to them that it was to their interest to be whole-hearted and true-hearted Americans. Americanization programs were carried out extensively in community, county, state and nation. Naturalization papers were secured by thousands and many thousands more declared their intentions of becoming citizens by securing their first papers.

But in all these efforts to Americanize the alien there is a woeful lack of effort to convince the alien that Americans observe the Gregorian calendar.

Experts tell us that the high cost of living is largely due to the shortage of production and the Julian calendar holidays constitute one of the largest causes for loss of production in America to-day.

The time has come when strenuous effort should be made to convince the alien that there is room for only one calendar in the United States of America, and that he must become Americanized in its fullest sense, which means that he will recognize only one flag, one language and one calendar.

GEO. A. LAUB,
Employment Manager, American Car & Foundry Co.,
Berwick, Pa.

[The following excerpt from a recent issue of *The Bulletin*, published in the interests of the employees at this plant, clearly demonstrates the effectiveness of a positive stand in abolishing this abuse.—ED.]

On Jan. 7 last year there were 493 persons absent from the plant without leave. Most of these men were Slavs and Russians, who took the day off as Christmas under the old calendar. The company then gave notice that this would not be tolerated again. On the seventh of January this year the number of absentees without leave was 50, and they will need to explain.

Now, let it be understood that the management does not assume to say what calendar or what religious faith

shall govern men in their private affairs. The only concern of the American Car & Foundry Co. is as to how it shall affect the efficiency of the shops. These are American shops on American soil and follow the American calendar, with Christmas falling on the twenty-fifth of December. If a man feels that he must follow a calendar that brings holidays on other days than those established by the Gregorian calendar, he should find a job where the other calendar is used.

Mechanical Engineers Consider Fuels

New fuel uses was the topic before the metropolitan section, American Society of Mechanical Engineers, at its meeting Jan. 13 in the Engineering Societies' Building, New York. The speakers were C. C. Trump, Fuller-Lehigh Co., New York, on "Pulverized Coal"; Lindon W. Bates, 71 Broadway, New York, on "Colloidal Fuel"; and E. H. Peabody, the Babcock & Wilcox Co., New York, on "Fuel Oil." In spite of the brief notification as to the program, the room was more than comfortably filled. The talks were illustrated with slides by all the speakers except Mr. Bates.

Mr. Trump, who was engaged in work with the Fuel Administration conservation board, spoke chiefly of the use of pulverized coal under boilers, a development of practically the last three years, though this fuel has been used in cement-making for 15 years. There are about 15,000,000 tons of pulverized coal burned annually, one-third of which is burned under stationary boilers, one-third under locomotive boilers, and the other third in ships and in metallurgical industries.

Most of the interest in this speaker's talk was in his description of the conveying system developed by his company and which he claimed to be dustless and safe as to fire. It consists of a screw feeder through which is admitted a small amount of compressed air, not anywhere near the amount necessary for combustion, thereby making the coal assume a fluid condition. This apparatus is connected to a pipe through which coal can be pumped continuously from one bin or hopper to another hopper, from pulverizing plant to the boiler plant or any number of furnaces of any kind. He claimed that because the amount of air is so small no large dust collectors are necessary on the bins, a small stove pipe being all that is required to take the air from the coal, so slowly does it come off.

Mr. Bates, who was with the Submarine Defense Association during the war, explained how colloidal fuel was the result of experiments to increase the steaming radius of ships and he told how that invention could be applied to peace, as has already been mentioned in THE IRON AGE in other issues. At this meeting he made public additional facts about the manufacture of this fuel, kept secret during the war.

He described protective colloids, whose functions are to hold the coal in suspension in the oil, and listed them as gelatine, the glues, casein, gum arabic, sodium oleate, dextrin, silicic acid and aged stannic acid. Comparing pulverized coal with colloidal fuel and oil in navy use he said: "Since coal pulverized required for storage nearly twice the volume needed for oil producing equal heat values, it was self-evident that the use of such coal would cut down the steaming radius." He attributed the stability of colloidal fuel to the size and weight of the carbon particles, absorption, surface tension, electrical attractions and repulsions and plastic inner friction.

He said that anthracite, semi-anthracite, bituminous and semi-bituminous coals, as well as lignites and peats are usable for making the fuel. This fuel does not leave masses of slag, most of the ash passing off with the gases, the rest falling to the grate in a fine powder. The water and sulphur can be averaged down by blending with other liquid hydrocarbons.

Mr. Peabody showed on the screen various approved devices for burning oil, including burners, systems for atomizing with air or steam, conveying systems for carrying the oil from storage to the burner. He also touched upon the well-known good features of oil as a fuel as compared to coal.

CONTENTS

Structural Business Increasing

December business booked by the bridge and structural plants of the country was greater than for any month since December, 1917, when 114 per cent of capacity was contracted for war work. A total of 153,000 gross tons or 85 per cent of capacity was taken in the past month, as compared with 69 per cent in November, and about 78 per cent for the preceding three-months period, according to the records of the Bridge and Structural Builders' Society, 50 Church Street, New York, compiled by George E. Gifford, secretary. The average capacity contracted for in the past year was 53.6 per cent or about 1,160,000 gross tons, as compared with 56 per cent in 1918, 59.5 per cent in 1917, 71.8 per cent in 1916, 72 per cent in 1915, and about 52 per cent in 1914.

Will Build a Large Plant

New York, Pittsburgh and Detroit capitalists have purchased the Lake Huron Steel Corporation, which recently obtained a large tract of land on the Indian reservation near Sarnia, Ont., directly across the river from Marysville, Mich., the site of the huge Wills-Leo industrial development. The new owners, under a Canadian charter, will soon begin building operations, with large outlay. The corporation is to produce steel alloy.

Iron and Steel Markets

CAR SHORTAGE THE FACTOR

Slow Moving of Products Backing Up at Mills

Pig Iron Active—Ship Material Sold for Year—Slackening Exports

Car shortage, which has for weeks been a checking factor in the movement of fuel to iron and steel plants, has now temporarily at least displaced low unit labor output as the chief obstacle in accelerating production. Slow headway is being made in shipping iron from stockyard piles and finished products are beginning to clog up rolling mills.

The upward climb of prices continues. With steel, the top levels have to do chiefly with resale lots, which were held for the expected rise, though urgent pressure has brought mill prices as high as 3.75c., Pittsburgh basis, for plates, with 4c. for plates under ¼ in., and even 4.25c. for steel bars.

Against the weight of the Steel Corporation's policy of holding to the level reached last March, there is the view that the fixed prices obtaining in the war period, $11 and $12 per ton higher, then regarded as reasonable, are surely justifiable now in the light of generally higher manufacturing costs. Some of the mills have gone beyond these figures in the face of buying pressure, but the total tonnage is after all relatively small.

Activity in the past week has been in pig iron rather than in steel. In the Cleveland district, 100,000 tons were sold to foundries connected with automobile companies. A feature there also was a sale of 1500 tons of basic at $40, Valley, but sales at lower prices are still reported. Malleable iron has sold in thousand ton lots for the last half at $41.25. Large basic inquiries have appeared for the last half and foundrymen are showing some concern over securing iron in the second half. In Buffalo the car shortage seriously affected pig iron movements.

The buoyancy of pig iron prices shows no signs as yet that the steel makers will be sellers on any large scale because their rolling mill operations cannot absorb the pig iron capacity.

A considerable tonnage of iron ore has been sold by Eastern interests and when sold for delivery up to April has been at somewhat higher prices than paid last year. Prices for delivery after April 1 are subject to change in harmony with prices on Lake Superior ores. It now seems probable vessel carrying charges on Lake Superior ores will be advanced 20c. and that the additional advance on the ore will be from 50c. to 80c.

Signs are that railroad demands will have to take their place alongside the general demand. Not merely the rails already placed by the corporate railroads but those yet to be bought will be delivered at mills' convenience. An apportionment of steel for the various forms of finished product will be practised, no given type of mill to be operated at the expense of another.

The first definite locomotive inquiries for the year include 100 for the Union Pacific, 45 for the Great Northern and 40 for the Missouri, Kansas & Texas.

Practically all the steel required for shipbuilding in 1920 has already been placed. Meanwhile shipping capacity has increased so largely that freight rates are reaching the true economic level and what ships may yet be arranged for will probably be of special construction for interests having particular shipping problems.

The fabricated steel trade is very promising with projects of a prodigious total awaiting decisions in the face of high labor and material costs. A good account was given in 1919, bookings amounting to no less than 153,000 tons in December and coming for the twelve months to within about 50,000 tons of the total for 1918.

Among the spectacular purchases of the week was the placing by the Ford Motor Co. of 87,000,000 nuts among a number of manufacturers. Bolt and nut makers are among those who are facing a shutdown through inability to get supplies, which were steadily obtained from stocks in the strike period.

Some attention is being given to the possibility that the makers of major steel products have not expanded facilities anywhere near in the ratio that the second line of manufacturers have. These, including reorganized manufacturing plants of war products, are proving to have an unexpected absorbing capacity. Expansion in sheet making alone stands out, which is not surprising in the light of the long sustained demand.

Buying on account of export has dropped somewhat sharply, though inquiries for semi-finished steel and for pig iron are conspicuous. Italy and England are sounding the market, while scarcity and high prices here are bringing a natural check to the movement.

Our cable from England registers again the rising scale of prices—£1 per ton in billets, £2 in steel hoops and 3s. per box in tin plates. Pig iron is also fully 10s. higher.

Eastern mills bought about 50,000 tons of heavy melting steel, most of it at $25, delivered. The demand for scrap seems to presage better production.

Pittsburgh

PITTSBURGH, Jan. 20.

Local conditions in the steel trade show no important change from those of one week ago, with the exception that the shortage in supply of cars seems to be getting worse and the movement of fuel to the blast furnaces and the mills is very bad. Shipments of finished material by the mills are being held up a good deal because of the shortage in cars. With no signs of relief from this situation in the near future, there is much complaint about the way the Fuel Administration is handling coal and the restrictions that are ruling in regard to its delivery. Coal intended for export is allowed a leeway of $1.25 to $1.50 over the price that the coal dealers are allowed to charge domestic consumers for run of mine coal, which is $2.35 per net ton at oven. A broker who has an export license for

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 20, 1920	Jan. 13, 1920	Dec. 23, 1919	Jan. 21, 1919
No. 2 X, Philadelphia‡	$44.35	$44.35	$41.10	$36.15
No. 2, Valley furnace†	**40.00**	39.00	39.00	31.00
No. 2, Southern, Cin'ti†	**43.60**	**41.60**	**39.60**	**34.60**
No. 2, Birmingham, Ala.†	**40.00**	38.00	36.00	31.00
No. 2, furnace Chicago*	40.00	40.00	40.00	31.00
Basic, del'd, eastern Pa.	**39.25**	**39.25**	**38.00**	**33.90**
Basic, Valley furnace	**38.00**	37.00	35.00	30.00
Bessemer, Pittsburgh	40.40	40.40	37.40	33.60
Malleable, Chicago*	**40.50**	**40.50**	**40.50**	**31.50**
Malleable Valley	**40.00**	38.00	38.00	31.50
Gray forge, Pittsburgh	**39.40**	38.40	36.40	31.40
L. S. charcoal, Chicago	47.50	47.50	42.50	38.85
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	48.00	48.00	48.00	43.50
O.-h. billets, Pittsburgh	48.00	48.00	48.00	43.50
O.-h. sheet bars, P'gh	50.00	50.00	50.00	47.00
Forging billets, base, P'gh.	64.00	64.00	60.00	56.00
O.-h. billets, Phila	59.10	59.00	54.00	47.50
Wire rods, Pittsburgh	60.00	60.00	60.00	57.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.75	3.745	3.745	3.745
Iron bars, Pittsburgh	3.50	3.50	3.50	3.50
Iron bars, Chicago	3.00	3.00	2.87	3.17
Steel bars, Pittsburgh	2.75	2.75	2.75	2.70
Steel bars, New York	3.27	3.27	3.27	2.97
Tank plates, Pittsburgh	2.65	2.65	2.65	3.00
Tank plates, New York	3.02	3.02	3.02	3.27
Beams, etc., Pittsburgh	2.45	2.45	2.45	2.80
Beams, etc., New York	2.82	2.82	2.82	3.07
Skelp, grooved steel, P'gh	2.45	2.45	2.45	2.70
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	3.00
Steel hoops, Pittsburgh	3.25	3.25	3.25	3.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 20, 1920 Cents	Jan. 13, 1920 Cents	Dec. 23, 1919 Cents	Jan. 21, 1919 Cents
Sheets, black, No. 28, P'gh.	**4.00**	4.35	4.35	**4.70**
Sheets, galv. No. 28, P'gh.	**5.95**	5.70	5.70	**6.05**
Wire nails, Pittsburgh	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, P'gh	$7.00	$7.00	$7.00	$7.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	$36.00	$36.00	$31.00	$26.00
Carwheels, Philadelphia	**38.00**	35.00	30.00	25.00
Heavy steel scrap, P'gh.	**27.00**	26.00	25.00	17.00
Heavy steel scrap, Phila.	**25.00**	24.50	23.50	16.00
Heavy steel scrap, Ch'go.	24.00	24.00	22.00	16.50
No. 1 cast, Pittsburgh	**33.00**	32.00	30.00	23.00
No. 1 cast, Philadelphia	**38.00**	35.00	32.00	24.00
No. 1 cast, Ch'go (net ton)	36.50	36.50	33.50	21.00
No. 1 RR. wrot, Phila.	**34.00**	33.00	31.00	24.00
No. 1 RR. wrot, Ch'go (net)	25.50	25.50	24.00	16.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$5.25
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	5.25
Foundry coke, future	7.00	7.00	7.00	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.50	19.50	19.00	20.00
Electrolytic copper, N. Y.	19.25	19.25	18.75	20.00
Spelter, St. Louis	9.30	9.37½	8.20	6.75
Spelter, New York	9.65	9.72½	8.55	7.10
Lead, St. Louis	8.50	8.62½	7.10	5.25
Lead, New York	8.75	8.87½	7.35	5.50
Tin, New York	64.00	65.00	55.50	71.50
Antimony (Asiatic), N. Y.	**10.75**	10.25	9.62½	7.50

shipment of coal can give to the producer the greater part of $1.25 or $1.50, and naturally the coal producer will accept orders for coal from the broker for export as they will net him at least $1 per ton over the price he can get from domestic consumers. It has happened frequently of late that coal for export shipment has been hauled right past domestic plants that are badly in need of coal, and have only one or two days' supply ahead. At present there are a number of large manufacturing plants in the Pittsburgh district that are very short of coal, and unless they get a supply very soon they will have to close down. These concerns report in the past week hundreds of cars of coal have gone past their plants for seaboard delivery and for export trade. There is a good deal of complaint, too, from consumers of coke that they are not able to buy spot coke, as most producers are now getting more money for furnace coke, sold on sliding scale contracts, than they can get for spot furnace coke under the Government price, which is $6 per ton at oven.

The demand for pig iron, semi-finished steel and finished steel products is urgent, but in the past week has not shown as much activity as in previous weeks. This applies especially to pig iron, which, while in fair demand, is not showing the great activity that has prevailed recently. Prices continue very firm, and tenders of new business by insistent purchasers at considerable premiums over the March 21 schedule are still being made, and in some cases accepted. Two makers of silvery iron have advanced prices $2 to $2.50 per ton.

Pig Iron.—Reports are current here of a sale by a Cleveland interest of 1500 tons of basic for fairly prompt shipment at $40 per ton at Valley furnace. The Allegheny Steel Co. has been a purchaser of 2500 to 3000 tons of basic iron at $37 at Valley furnace and another consumer has bought 1500 tons of basic iron at the first price. There have been considerable sales of No. 2 plain iron at $40 at Valley furnace and the market seems to be fairly established at this price. Also several small sales of malleable iron at $40 to $41 at Valley furnace. There is a moderate inquiry for basic iron, but Bessemer is quiet. We now quote as follows Valley furnace, the freight rate for delivery to the Pittsburgh or Cleveland districts being $1.40 per gross ton:

Basic	$37.00 to $38.00
Bessemer	39.00
Gray forge	38.00
No. 2 foundry	40.00
No. 3 foundry	39.50
Malleable, Valley	40.00 to 41.00

Ferroalloys.—Consumers of ferromanganese are well covered over first half, but there is an insistent demand for second half delivery, and some sales have been made. Domestic producers are quoting 76 to 80 per cent ferromanganese at $145 to $150, delivered. A sale of 600 tons, equal deliveries over last half, is reported at the lower figure. Two makers of silvery iron have advanced prices, one $2 a ton and the other $2.50 per ton.

We quote 76 to 80 per cent domestic ferromanganese $145 for second half delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $80 to $85, and 18 to 22 per cent spiegeleisen at $43 to $45, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent, $56.50 to $57. An advance of $3.20 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Semi-Finished Steel.—It is believed the acute shortage in supply of sheet bars will soon be relieved to some extent, as the output by the mills is steadily increasing. There are still cases where large consumers who are in distress for sheets are buying sheet bars, and having these converted into sheets at so much per ton, the net

cost of the sheets figuring out a good deal higher than the March 21 schedule. The Carnegie Steel Co. is now operating at very close to 95 per cent of ingot capacity, and other steel mills are doing about as well.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $48 to $50; 2 x 2-in. billets at $48 to $50; slabs, $50 to $52; sheet bars, $52 to $55, and forging billets, $66 to $68 base, all f.o.b. at mill Pittsburgh or Youngstown.

Structural Material.—Inquiry continues very active, and local fabricators are bidding on more new work than at any time in the past two years. The Jones & Laughlin Steel Co. has taken 400 tons for a building for the Buffalo Steel Co. and 700 tons for a plant addition for the Pittsburgh Plate Glass Co., Ford City, Pa. The McClintic-Marshall Co. has taken 3500 tons for a steel building for a Western interest and the American Bridge Co. 800 to 1000 tons for an armory building. We continue to quote plain material up to 15 in. at 2.45c., Pittsburgh.

Plates.—Some small orders for cars are coming out, the Gulf Refining Co. having placed 1200 tank cars, which will require about 20,000 tons of plates and shapes, to be furnished by two local mills. Very heavy inquiries for plates are in the market, mostly for the building of tank cars and oil tanks, for use in the oil-producing fields in Louisiana and Texas. Local plate mills are filled up for months ahead, and are not taking on new business except for regular customers and extended delivery. We quote sheared tank plates, ¼ in. and heavier, at 2.65c. to 3.25c., f.o.b. mill Pittsburgh, prices depending upon the customer, the size of the order and the delivery wanted

Sheared tank plates, ¼-in. and heavier, at 2.65c. to 3c., Pittsburgh, depending on order and delivery.

Sheets.—Conditions in the sheet trade are unchanged. The mills are well sold up over first quarter and have a good deal of tonnage booked for second quarter delivery. Some large consumers of sheets are still offering the mills heavy premiums over regular prices for fairly prompt delivery. However, it is said that fully 90 per cent of the business on the books of the sheet mills at present is at the March 21 schedule of prices. There would be no trouble in getting $5 to $10 advance over these prices for delivery 60 to 90 days from date of order.

We now quote No. 28 gage, box annealed, one-pass black sheets at 4.35c. to 4.60c; No. 28 galvanized, 5.75c. to 5.95c., and No. 10 blue annealed at 3.55c. to 3.80c., the lower prices named being the March 21 schedules

Tin Plate.—Conditions in this trade are quiet. The output of tin plate for first half has been sold and mills are now entirely concerned in getting out maximum production of tin plate to meet the needs of consumers, which are very urgent. Some consumers of tin plate have already sent in specifications for shipments as far ahead as June. Nearly all mills are operating at 95 to 100 per cent capacity, but actual output is probably not over 85 to 90 per cent. We quote tin plate for domestic consumers for first half of this year delivery at $7 per base box at mill, Pittsburgh, while for export shipment $8 to $8.50 per base box are quoted.

Wire Rods.—The demand for wire rods is a good deal heavier than the supply. Two local mills say they are not quoting, as they need all their rods for their own wire mills. We quote soft Bessemer and open-hearth bars at $52 up to $65 per gross ton at mill. High carbon rods range from $75 to $100 per gross ton, prices depending entirely on the carbon content.

Wire Products.—There is no abatement in the heavy demand for wire nails which has existed for so long and which is much larger than the mills can furnish. Stocks of wire nails in jobbers' and consumers' hands are very badly depleted. It is said that in emergency cases several mills have sold wire nails at as high as $6 per keg base for fairly prompt shipment. There is also a great shortage in supply of plain wire for manufacturing purposes. We now quote wire nails at $3.25 to $4.25 base and plain wire for manufacturing purposes at 3c. to 3.50c., the lower prices named being those of a leading interest.

Iron and Steel Bars.—The shortage in supply of steel bars does not promise to be relieved for some time, and it is evident that considerable new steel bar mill capacity is needed to meet the increasing consumption, which has grown very much in the last two or three years. It is said the Carnegie Steel Co. will rush work on its new steel bar and hoop and band mills at McDonald, Ohio, not much active work having been done on these for some months. Two local makers of steel bars report they are filled up practically over first half of this year.

We quote steel bars rolled from billets at 2.35c. to 3c. and from old steel rails, 3c. Pittsburgh mills rolling iron bars quote, at 3.25c. to 3.50c., Pittsburgh, plus full freight rate to point of delivery.

Hot-Rolled Strip Steel.—The new demand is not very active, as consumers are pretty well covered over first quarter and some over first half of this year. We quote hot-rolled strips at 3.50c. to 3.75c. per pound f.o.b. Pittsburgh, with reports of sales at 4c. for fairly prompt delivery.

Cold-Rolled Strip Steel.—Consumers are covered over this quarter and some for second-quarter delivery, prices on the latter to be fixed later and to be those in effect at the time of shipment. We quote cold-rolled strip steel for deep stamping and other special purposes at 6c. per lb. at mill in large lots.

Cold-Rolled Steel Bars.—Makers report they are sold up for first quarter and have also covered some of their larger customers for second quarter, prices for the later delivery to be fixed later. We quote cold-rolled steel bars at 3.60c. to 4c. per lb. f.o.b. Pittsburgh.

Bolts, Nuts and Rivets.—Makers report that customers are specifying very freely against contracts and that their output is sold up for the first quarter, with considerable business on their books for second-quarter delivery. Discounts on nuts and bolts quoted by local makers, and also prices on rivets are given on page 303.

Boiler Tubes.—Makers report the demand heavy and they are well filled up over the next three or four months. It is stated the March 21 schedule of discounts is now being firmly held, and this is given on page 303.

Iron and Steel Pipe.—Reports that the leading interest would soon announce higher prices on merchant pipe and oil country goods are officially denied. Three or four mills are now quoting prices on some sizes of merchant pipe and oil well supplies ranging from $7.50 to $10 per ton higher than those of the leading interest. Mills are filled up for some months, but some makers have a limited tonnage to sell for second quarter shipment. The March 21 discounts are still being quoted by the leading interest and by some mills to regular customers, and these discounts are given on page 303.

Spikes.—A Western road is reported to have placed 25,000 kegs of standard railroad spikes for delivery in first half, of which 10,000 kegs or more went to two local makers. The demand for railroad spikes has been active for some time, and makers say that they are pretty well filled up over the next two or three months. The demand for barge and boat spikes is only fairly active.

We quote standard spikes, 9/16 x 4½ in., at $3.35 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅝ in., 7/16 in. and smaller, at $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, $4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, f.o.b. Pittsburgh. For less than carload lots 1c. per lb. higher is asked.

Old Material.—The demand for scrap from local consumers is fairly active, but not many sales are being made, as dealers believe prices are bound to be higher very soon, and they are not anxious to sell. Reports are that the scrap markets in Youngstown, Warren and Cleveland, are very active in demand and prices range from $1.50 to $2 per ton higher than in the local market. Reports that the Carnegie Steel Co. had lately bought 25,000 to 30,000 tons of heavy steel melting scrap are not confirmed. The Pittsburgh Steel Co. is again accepting shipments of heavy steel scrap, and has been a buyer recently in the local market to some extent. Dealers who have scrap piled in their yards are satisfied to hold it until later, figuring the market will certainly be higher. There is still a scarcity in supply of borings, which are hard to obtain.

All grades of steel melting scrap are up $1 to $1.50 per ton over last week's prices. We note sales of 2000 tons, or more, of selected heavy steel melting scrap at $27, delivered, and 1000 tons of low phosphorus melting stock, billet and plate ends, at $32, delivered. We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$27.00 to $27.50
No. 1 cast for steel plants	33.00 to 34.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	34.00 to 35.00
Compressed steel	24.00 to 25.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh, district	19.00 to 20.00
Bundled steel stamping	18.00 to 19.00
No. 1 busheling	24.00 to 25.00
Railroad grate bars	24.00 to 25.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	32.00 to 33.00
Railroad malleable	26.00 to 27.00
Iron car axles	34.00 to 35.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Cast iron wheels	33.00 to 34.00
Rolled steel wheels	27.00 to 28.00
Machine-shop turnings	15.50 to 16.00
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	25.00 to 26.00
Cast iron borings	19.00 to 20.00
No. 1 railroad wrought	28.00 to 29.00

Coke.—On Monday, this week, several large coke producers reported supply of cars about 50 per cent, but it is certain it will be less over the remainder of this week. The shortage in supply of cars is causing a scarcity in blast furnace coke, and nearly all large users of furnace coke are trying to buy in the open market, but very little spot coke is offering. There is a plentiful supply of labor to load the limited amount of cars being furnished, and also a fairly good supply of coke labor. Producers are not selling spot coke, but are applying practically their entire output on their contracts, some of which are now netting producers more than $6 per ton, which is the Government price. Several deals involving large coke plants are under way, and one or two plants will likely change hands this week. Output of coke in the upper and lower Connellsville regions for the week ending Jan. 10 was 240,550 tons, a slight increase over the previous week. We continue to quote $6 for spot and future furnace coke, and $7 for spot and future 72-hr. foundry coke, in net tons at oven.

W. R. Case & Sons Cutlery Co., Bradford, Pa., manufacturer of high-grade cutlery, is building a large addition to its present plant, and has acquired 30 acres, part of it in that city and part of it adjoining Bradford, on which it has started to erect a new razor and pocket knife plant, and expects to improve this property still further by putting up houses for its workmen.

Power piping was discussed in a paper by J. Roy Tanner, vice-president and general manager, and George J. Stuart, chief engineer Pittsburgh Valve Foundry & Construction Co., Pittsburgh, before a recent meeting of the Engineers' Society of Western Pennsylvania, Union Arcade Building, Pittsburgh. The paper covered the subjects of materials, effect of superheated steam, pipe joints, details of construction, drawings.

Director General of Railroads Hines has authorized, on 10 days' notice, application via Pittsburgh & Lake Erie—Baltimore & Ohio railroad route—of commodity rate of $2.90 a net ton on coke, carloads, from Clairton, Pa., to Washington and Georgetown, D. C., now applied via the Pennsylvania railroad to Washington.

The Colonial Steel Co., Pittsburgh, has issued a pamphlet entiled "The Colonial Tool Steel Treating Book," which gives directions for hardening, drawing, forging, etc., for various carbon and high speed steels.

Chicago

CHICAGO, Jan. 20.

Railroad buying has shifted from rails to locomotives. The largest order comes from a foreign source, namely, the Belgian Government railroads, which have purchased 150 engines, the order being equally divided between the Baldwin and American Locomotive companies. In this country few of the carriers have gotten beyond the inquiry stage, an exception being the Norfolk & Western, which has ordered four switch engines from the Baldwin Locomotive Works. A number of large inquiries, however, have appeared. The Union Pacific is in the market for 100 locomotives, including 19 Mallet type, 25 Santa Fe type, 16 Mikado type, 10 Pacific type and 30 switchers. The Great Northern wants 45 Mikados and the Missouri, Kansas & Texas is asking for prices on 40 engines, including 10 Pacific type, 20 Mikado type and 10 switchers. The Vicksburg, Shreveport & Pacific is inquiring for five switchers and other roads which are considering purchases of new motive power include the Chesapeake & Ohio and the Western Maryland. The railroads are also looking to their bridge requirements, the Great Northern having placed contracts for the fabrication of 2300 tons of bridge work. There continues to be a pronounced scarcity in plates, shapes and bars with apparently little hope for an early change for the better. Cast iron pipe is also difficult to secure in the small sizes, but inquiries are more numerous, indicating that pipe users regard the new price level as stable.

On Jan. 21 Kansas City will open bids on 2600 tons, principally 48-in. pipe. The feature of the bolt and nut market this week was the purchase of 87,000,000 nuts by the Ford Motor Co.

Inquiries for second half foundry and malleable pig iron are numerous, and a few large sales have been made, two Michigan interests having purchased 10,000 and 4500 tons of foundry respectively. Prices are strong and further advances are looked for. The leading interest has sold small lots of spot No. 2 foundry at $42 and an Ohio furnace has taken a number of good-sized orders at $41, furnace.

In the ferroalloys, ferromanganese is advancing rapidly, the most recent sales in this district being at $150, delivered. Scrap is dull.

Iron and steel production in this district is getting back into full swing, the only important limiting factor being a discouraging car situation which makes deliveries of coal and coke exceedingly uncertain. The leading interest has blown in a third furnace at Joliet and as a result is now operating all its blast furnaces except one at South Chicago and one at Milwaukee, outside of one each at Joliet, South Works and Gary, which are being relined. Both the Wisconsin Steel Works and the Inland Steel Co. have blown in their remaining stacks and the leading merchant iron producer also has all its furnaces going.

Pig Iron.—The market is active and strong, with high prices in prospect. Second half inquiries for foundry and malleable are numerous, and some good-sized tonnages have been placed. A Michigan melter has bought from 8000 to 10,000 tons of foundry of special analysis averaging 2.10 per cent silicon and over and 0.90 per cent manganese and over for last half shipment and another interest in that State has bought 4500 tons of foundry for last half and 2000 tons for first half, some of which brought as high as $41, furnace, for No. 2 material. A third Michigan consumer is in the market for 1500 tons of malleable for second half delivery. The leading local interest continues to book limited tonnages of foundry and malleable for last half shipment at the present prices, but has sold spot material at a premium of $2. An Ohio producer continues to sell for both first and last half at $41, furnace, for No. 2 foundry, and two large Southern makers are taking business for first half at $40, Birmingham. A large Virginia producer which had been selling at $40 base furnace for 1.75 to 2.25 per cent material has withdrawn from the market, but before doing so booked 2000 tons from a Wisconsin melter. Ohio silvery furnaces have advanced prices $2.50, but a Tennessee pro-

ducer is taking business at quotations which, with the freight charges to this district, approximate the old Jackson County prices. One local consumer has purchased 500 tons of copper-bearing low phosphorus at about $41, Eastern furnace, and another melter has bought 400 tons. A Milwaukee furnace is about to go in on copper free material, and has taken business for second quarter shipment Production of merchant pig iron is getting back into full swing in this district. The Iroquois Iron Co. has blown in the stack which it rebuilt and expects to secure an average daily output of 600 tons. All of the furnaces of the Steel & Tube Co. of America are now in blast including the merchant stacks at Mayville, Wis., and at Duluth, Minn. The Inland Steel Co. has blown in its third furnace, as has the Wisconsin Steel Works, both of these stacks being employed on foundry iron.

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average sil. 1.50, f.o.b. furnace, average freight to Chicago, $2.50 (other grades subject to usual differentials)	$45.00
Northern coke No. 1, sil. 2.25 to 2.75	42.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	40.00
Northern high phos. foundry	40.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	48.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	46.60
Southern foundry, sil. 1.75 to 2.25	45.00
Malleable, not over 2.25 sil	40.50
Basic	39.00
Low phos. (copper free)	46.50
Silvery, 7 per cent	$51.65 to 54.30

Ferroalloys.—Ferromanganese is scarce and is rapidly advancing, the most recent sales in this district, among which we note one of 200 tons, being closed at $150 delivered. Ferrosilicon 50 per cent and spiegeleisen are also stronger, the ruling quotation on the former being $85 delivered and on the latter $45 to $50, furnace.

We quote 80 per cent ferromanganese at $150 delivered; 50 per cent ferrosilicon at $85 delivered; spiegeleisen, 18 to 22 per cent, $45 to $50 furnace.

Plates—Inquiry continues heavy but the supply is at a low ebb with most independents out of the market and the foremost interest capable of taking only limited additional tonnage. Further sales of slabs to Eastern plate mills have been closed at $51 Chicago.

The mill quotation is 2.65c. to 2.90c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Structural Material.—The Great Northern Railroad has awarded 2315 tons of miscellaneous bridge work, divided as follows: 1000 tons to the Milwaukee Bridge Co., 750 tons to the Wisconsin Bridge & Iron Co. and 565 tons to the Strobel Steel Construction Co. The Bensell-Elcock Co. will fabricate 1028 tons for the Old Colony Life Insurance Building, Chicago. Other recent awards include:

United States Government, three lock gates, Wheeling, W. Va., 750 tons, to Milwaukee Bridge Co.

Des Moines Foundry & Machine Co., gray iron foundry, 400 tons, to Northwestern Bridge & Iron Co.

First Federal Trust Co., bank building, San Francisco, 300 tons, to Central Iron Works.

Highway spans, Peary, Kelsey and Alborn, Minn., 206 tons, to unknown fabricator.

American Skein & Foundry Co., Racine, Wis., foundry addition, 160 tons, to Worden-Allen Co.

Current inquiries include:

Public school, Augusta and Larrabee streets, Chicago, 440 tons.

Joliet Railway Supply Co. plant, Chicago, 250 tons.

Peerless Foundry Co., plant, Cincinnati, 100 tons.

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for materials out of warehouse.

Bars.—There is an acute shortage of mild steel bars with the result that hard steel and iron bars are being substituted when possible. Orders for these forms of bars have been so heavy, however, that they too are difficult to obtain for prompt delivery, most mills being sold ahead through the quarter. One bar iron mill, in fact, contemplates an early withdrawal from the market. The minimum quotation on bar iron continues at 3.25c., Chicago, iron bands commanding a premium of 0.35c. above that price. To guard against future advances in re-rolling rails, rail-carbon mills are closing most of their business on the basis of prices ruling at time of delivery.

Mill prices are: Mild steel bars, 2.35c. to 3.25c. Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.25c., Chicago; rail carbon, 3.25c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Sheets.—As sheets are practically unobtainable the mill prices quoted below are nominal.

Mill quotations are: 4.60c. for No. 28 black; 3.80c. for No. 10 blue annealed, and 5.95c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.82c.; No. 28 black, 6c.; No. 28 galvanized, 7.50c.

Wire Products.—As a result of steadily improving mill operation, the leading interest is taking business more freely. Its ability to book orders, however, is far short of the demand. It is as yet making no commitments whatever on fencing. For mill prices, see finished iron and steel, Pittsburgh, page 303.

Rails and Track Supplies.—No further rail contracts have been signed but a heavy business in track fastenings continues to be closed. Both the domestic and foreign demand for light rails is good, the leading interest having booked an order for 3000 tons for delivery in the Far East.

Standard railroad spikes, 3.35c. to 3.60c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c. Pittsburgh. Steel tie plates and iron angle bars, 2.75c. Pittsburgh and Chicago: tie plates, iron, 3.25c. f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Bolts and Nuts.—The Ford Motor Co. has bought 87,000,000 nuts from a number of manufacturers. Aside from this purchase, the market is without features, the demand being in excess of the supply and output anything but encouraging. Most workers had a good supply of raw material when the steel strike was called, but this is steadily being exhausted and little new nut stock is coming in from the mills. Unless the steel manufacturers are able to increase their shipments to the nut and bolt plants, the latter fear they will be forced to shut down. An Indiana nut shop has withdrawn from the market. For mill prices, see finished iron and steel, Pittsburgh, page 303.

Jobbers quote: Structural rivets, 4.97c.; boiler rivets, 5.07c.; machine bolts up to ⅞ x 4 in., 35 and 5 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ⅞ x 6 in., 30 off; larger sizes, 20 off; hot pressed nuts, square tapped and hexagon tapped, $1.45 off; coach or lag screws, gimlet points, square heads, 40 and 5 per cent off. Quantity extras are unchanged.

Old Material.—The market is generally quieter and while there have been very few advances, there have been no declines. Heavy melting and rolling mill grades are particularly dull, activity being confined largely to foundry material. The Santa Fe has issued two lists aggregating 3000 tons and the Rock Island offers about 1000 tons.

We quote delivery in buyer's yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$30.00 to $31.00
Relaying rails	40.00 to 50.00
Car wheels	36.00 to 37.00
Steel rails, rerolling	34.00 to 35.00
Steel rails, less than 3 ft.	28.50 to 29.00
Heavy melting steel	24.00 to 25.00
Frogs, switches and guards, cut apart	24.00 to 25.00
Shoveling steel	24.00 to 24.50
Low phos. heavy melting steel	27.00 to 28.00

Per Net Ton	
Iron angles and splice bars	$29.50 to $30.50
Steel angle bars	24.00 to 24.50
Iron arch bars and transoms	29.25 to 30.25
Iron car axles	35.00 to 36.00
Steel car axles	32.50 to 33.00
No. 1 busheling	20.50 to 21.50
No. 2 busheling	15.00 to 15.50
Cut forge	23.00 to 23.50
Pipes and flues	19.00 to 19.50
No. 1 railroad wrought	25.50 to 26.50
No. 2 railroad wrought	23.00 to 23.50
Steel knuckles and couplers	24.50 to 25.00
Coil springs	26.50 to 27.00
No. 1 cast	36.50 to 37.00
Boiler punchings	26.50 to 27.00
Locomotive tires, smooth	25.50 to 26.00
Machine-shop turnings	11.75 to 12.25
Cast borings	14.50 to 15.50
Stove plate	29.50 to 30.50
Grate bars	29.00 to 30.00
Brake shoes	25.50 to 26.50
Railroad malleable	28.50 to 29.50
Agricultural malleable	28.50 to 29.50
Country mixed	18.50 to 19.50

Cast Iron Pipe.—Municipalities have apparently given up hope of any early reduction in prices and are hastening to cover their needs. Pipe shops, on the other hand, are practically sold up on all sizes, although they can still book some further business in large pipe. Kansas City will let 2640 tons, largely 48-in. pipe, on Jan. 21. Havre, Mont., has awarded 110 tons to the American Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $69.80; 6-in. and above, $66.80; class A and gas pipe, $2 extra.

Buffalo

BUFFALO, Jan. 19.

Pig Iron.—A large aggregate tonnage has been placed during the week, about 50,000 tons, foundry grades and malleable, almost entirely for second half delivery; all furnaces being practically sold up for first half. One furnace interest has booked over 20,000 tons foundry grades, another 12,000 tons foundry and 12,000 tons of malleable; and there is about 25,000 tons in inquiry still before the market, including would-be buyers from Michigan, Indiana and even Chicago as well as from New York State and New England. There appears to be an active disposition on the part of foundrymen to secure a place on furnace order books as far ahead as September in anticipation of a more acute shortage of iron. The district is now producing much under normal, owing to the continued shutdown of three of the Rogers-Brown stacks, and none of the interests is pushing second half iron very strongly because all desire to reserve as large a portion of furnace capacity as possible for regular customers. Demand is in excess of production and costs are liable to mount owing to possibility of freight rates going up, increasing costs of raw materials. Most of the large furnace interests are adhering to the $40 base schedule of prices, up to $43 for 2.75 to 3.25 silicon; but the interest that has made the largest sales for the week is selling at the high side of the schedule shown below, viz: $42 base, up to $45, according to silicon content. This interest also states that owing to the possibility of higher freight rates and costs of raw material, the iron it will have for sale may go up to $45 or $48. Considerable tonnages of Canadian furnace iron continue to come into this market owing to pressure of demand. We quote as follows f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$43.00 to $45.00
No. 2X, 2.25 to 2.75 sil.	41.25 to 43.25
No. 2 plain foundry, 1.75 to 2.25 sil.	40.00 to 42.00
Malleable, sil. not over 2.25	41.25
Basic	39.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	42.60

Finished Iron and Steel.—The situation with reference to securing steel products is becoming more desperate. Many users who have been able to keep running in expectation that the end of the steel and coal strikes would ease the situation are finding it more difficult to place orders and secure deliveries for their actual requirements, even from their old sources of supply. While the shortage heretofore has been confined to the lighter lines, the heaviest demand being for bars and sheets, it is commencing to be felt in shapes and plates. The price for sheets continues to advance, everything produced in this district having been sold up for first quarter for some time past; and although premiums are being offered there appears to be nothing open for sale for the next month or two. Butt and lap-welded pipe have also gone up, producers having sent out basing cards to distributors during the week, showing an advance of $7 per ton.

Old Material.—There is an aggregate of inquiry for 25,000 tons of heavy melting steel before the market, but very few sales are consummated due to shortage of material and also to a wide divergence in price views, most dealers preferring to hold on for higher prices rather than to sell now. Demand from the Youngstown district has been large, and it is stated that on the spurt $27 per ton has been paid there. Strong demand is in evidence for borings and turnings, and inquiry in all lines is heavy, both locally and from outside the district. Prices remain firm at the top notch of last week's schedule: We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel, regular grades	$25.00 to $26.00
Low phos., 0.04 and under	32.00 to 33.00
No. 1 railroad wrought	28.00 to 29.00
No. 1 machinery cast	31.00 to 32.00
Iron axles	40.00
Steel axles	40.00
Car wheels	33.00 to 34.00
Railroad malleable	26.00 to 27.00
Machine-shop turnings	16.50 to 17.00
Heavy axle turnings	20.50 to 21.00
Clean cast borings	20.00 to 21.00
Iron rail	28.00 to 29.00
Locomotive grate bars	24.00 to 25.00
Stove plate	24.00 to 25.00
Wrought pipe	19.00 to 20.00
No. 1 busheling	21.00 to 22.00
Bundled sheet stamping	18.00 to 19.00

Birmingham

BIRMINGHAM, ALA., Jan. 19.

Pig Iron.—At the close of business on Saturday, Jan. 17, the Birmingham iron market was on a firm level of $40 for any delivery. Sales of 3000 to 4000 tons in Chicago and Cincinnati territory at that figure were made earlier in the week and two concerns made sales of small amounts in St. Louis territory at that price. Every maker was on the same basis, having followed the week earlier lead of the concern first quoting that price. The total business known to have been done at $40 was around 5000 to 6000 tons. That price has been named to agents and the companies will probably book largely if consumers wish it done. No special anxiety on the part of the consumers has developed, but there seems to be the same readiness to absorb offered tonnage at each advance. The trade is singularly poised considering the quick succession of the recent raises. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, sil. 1.75 to 2.25	$40.00
Basic	39.00
Charcoal	50.00

Cast Iron Pipe.—Cast iron pipe price schedules will probably be raised this week. They are now $63 for 4 in. and $60 for 6 in. and upwards. Intimation is that $40 pig iron will carry quotations as high as $68 and $65, certainly from $2 to $3 above the present. One concern has orders for 3000 pieces of flange pipe for the Standard Oil Co.

Coal and Coke.—Alabama coal output has more than recovered normal, having reached 366,000 tons per week compared with 377,000, the largest 1919 week's production. There is sufficient foundry coke available at $9.75. Fires have been lighted in the by-product plant of the Birmingham Coke & By-products Co., 60 Koppers ovens. The Vulcan Rivet works and National Cast Iron Pipe Co. will take some of the gas.

Old Material.—The scrap market is brisk with healthy demand for both steel and cast, wrought going slowly on account of minor operations in that field. Prices are firm and stocks are running low. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$21.00 to $22.50
No. 1 heavy steel	20.00 to 21.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
Stove plate	25.00 to 26.00
No. 1 cast	27.50 to 29.00
Car wheels	27.50 to 29.00
Tramcar wheels	26.50 to 28.00
Steel axles	29.00 to 30.00
No. 1 wrought	24.00 to 25.00

"Midwest Wait Turbines," by H. H. Wait; "Midwest-Hill Centrifugal Pumps," by V. Schleyer, and "The Diesel Engine," by N. McCarty, are the subjects of three booklets issued by the Midwest Engine Co., Indianapolis. These are reprints of addresses delivered at the company's sales convention held at Indianapolis, Dec. 3 to 6. Copies can doubtless be had by addressing the Midwest Engine Co.

Boston

BOSTON, Jan. 20.

Pig Iron.—No general demand for iron is noted, but sales for the past week have been satisfactory. One Buffalo furnace has sold 1000 tons, silicon 1.75 to 2.25 and 2.25 to 2.75 for second half delivery, on $42 furnace basis. Another furnace has sold 1000 tons, silicon 2.25 to 2.75, at $39.25 furnace, or around $43 delivered. Approximately 10,000 tons of Pennsylvania iron has changed hands during the past week. Of this amount, about 8000 was for last half delivery on a $42 furnace base, two-thirds being silicon 2.25 to 2.75. Some third quarter iron, silicon 2.25 to 2.75, sold at $43 furnace, which represents an advance of $1. A western Pennsylvania furnace sold 1200 tons No. 2 plain on this market at $39.25 furnace, which brings the delivered price up to $43.95. About 5000 tons of Alabama has been sold since last reports for first and second quarter delivery, on a $40 furnace base. Alabama furnaces are not offering second half iron. One thousand tons, silicon 1.75 to 2.25 warrants, sold to a Connecticut consumer at $38 Birmingham, a spot cash transaction, against a regular furnace schedule of $40. The Virginia Iron, Coal & Coke Co. has withdrawn from the market. The last sales were made on a $40 to $40.25 furnace base for silicon 1.75 to 2.25. The Rhode Island Malleable Iron Works, Hills Grove, R. I., has covered its malleable requirements on better than a $41 furnace base, the 600 tons being split up among sellers. A small amount of Salsbury charcoal brought $62.25 furnace, while 500 tons of Michigan charcoal was taken on a $45 furnace and higher base. The total sales of all iron for the past week were about 20,000 tons. The Laconia Car Co., Laconia, N. H., is in the market for 300 tons, silicon 2.75 to 3.25, second half delivery.

Eastern Pa., No. 2X, sil. 2.25 to 2.75.	$46.15
Eastern Pa., No. 2 plain, sil. 1.75 to 2.25	44.90
Buffalo, No. 2X, sil. 2.25 to 2.75....	46.15
Buffalo, No. 2 plain, sil. 1.75 to 2.25	44.90
Virginia, No. 2X, sil. 2.25 to 2.75...$45.95 to	46.95
Virginia, No. 2 plain, sil. 1.75 to 2.25 44.70 to	45.70
*Alabama, sil. 2.25 to 2.75.....	47.35
*Alabama, No. 2, sil. 1.75 to 2.25....	45.75

* F.o.b. alongside Boston.

Warehouse Business.—The leading warehouses here have made a general advance in their quotations. Cold-rolled steel has been advanced 50c. per 100 lb., soft steel, concrete bars, structural, tire steel, spring steel, toe calk steel, band steel, band iron 25c., steel hoops and iron hoops $1, and refined iron 40c. Plates have been marked up 85c. and blue annealed sheets 25c. Copper sheets are 1c. higher at 29½c. base. The advance is the most sweeping one made in some time. It is due to the inability of the jobbers to secure material from the mills in desired quantities and the smallness of local stocks. Fancy prices are being offered for nails, but few are obtainable.

Jobbers quote: Steel bars, cold rolled rounds, $6 per 100 lb. base; squares, hexagons, flats, $6.50 base; soft steel, flats, rounds, squares, $4.25 base; concrete bars, plain round, square, $4.25; twisted squares, $4.75; structural steel under 3 in., $4.25; structural, 3 in. and over, $4; tire steel, $4.95; spring steel open hearth, $8.75; special, $12.75; toe calk steel, $6.25; steel hoops, $6.45; steel bands, $5.45 iron, refined, except as follows, $4.50 base; ½ in., 9/16 in. round, square and 2¾ in. round, square and larger, $4.90 base; 7/16 in. round, square and smaller, $5.50 base; over 6 in. wide, $5.50 base; best refined iron, $5.50 base; Wayne iron, $7 base; band iron, $5.45; hoop iron, $6.45; Norway iron, $20; No. 10 blue annealed sheets, $5.55 base; No. 28 black sheets, $7.65; No. 28 galvanized sheets, $8.50; plates, $4.80 base.

Finished Iron and Steel.—One of the largest independent steel companies has advanced its price on bar iron ¼c., from 3.50c. to 3.75c., f.o.b. Pittsburgh base. Its price on structural is now 2.65c., f.o.b. Pittsburgh, on large tonnages and 2.75c. on small, and it has advanced plates to 3.25c., f.o.b. Pittsburgh base. The price situation on finished iron and steel otherwise remains unchanged. The supply situation has not changed noticeably since last reports. The mills are, perhaps, making little prompter deliveries, but most of the local representatives are not accepting business except in special instances. The call for stock is still urgent, especially for concrete and small iron and steel bars, and sheets, which are especially short. Few important structural contracts have been placed during the past week. The Kellogg Structural Steel Co. has been awarded 105 tons for the Watertown Arsenal bar stock storage plant. The Bethlehem Steel Co. is awarded the columns and the New England Structural Co. the structural for the new John Hancock building, but the exact tonnage involved is not known at the moment. The Federal Reserve Bank building tonnage is still open.

Tool Steel.—According to warehouse interests, shipments of tool steel are coming forward from the mills slowly and irregularly. For that reason some difficulty is experienced in keeping certain sizes in stock. So far as is known, nobody actually is suffering for stock, however. Tool steel houses are of the opinion that the demand, which at the moment is only fairly active, will increase within a month, and that 1920 will go down in history as a record-breaker in activity and prosperity. Prices are strong, but unchanged.

Ordinary tool steel, 16c. per lb. base; extra, 19c. base; special, 24c. base; double special, 66c. base; non-changeable, 36c. base; high speed steel, $1.50 base. Mill shipments are quoted at 1c. per lb. less.

Old Material.—A flurry of buying by dealers early in the week caused a sharp advance in heavy melting steel and railroad wrought. One dealer paid as high as $30 for railroad wrought, but later secured more at $28, and to-day his maximum price is $27.50. The best offer made for 2000 tons of heavy melting steel to-day for $20.50, whereas three or four days ago $21 was paid. Yard wrought is quiet, Portland, Danversport and Pawtucket being out of the market. Chemical interests have offered as high as $20 f.o.b. yard for borings. Machine shop turnings have advanced about $1.50. The highest price paid for No. 1 scrap during the past week was $38.50 delivered. Sales of mixed Nos. 1 and 2 have been made at $37 delivered. Small interests are holding out for higher prices, and large ones have little for sale. Stove plate is easily 50c. higher and hard to obtain. Rerolling rails sold at $29.10 f.o.b. yard, which represents an advance of about $1. A Connecticut consumer bought 150 tons of car wheels at $37 delivered, the top price for this movement. Another consumer paid $35 delivered, the freight being about $3. Since last reports the General Electric Co., Lynn, sold 54 cars of old material, one local representative of a Philadelphia house securing 30 of them. The Bridgeport, Conn., District Salvage Board offers by negotiation 4,021,272 lb. heavy melting scrap located at the Penn Seaboard Steel plant, New Haven. The Boston District offers 44,266 lb. steel forgings located at Bryant Chucking Grinding Co., Springfield, Vt.

No. 1 heavy melting steel	$20.00 to $21.00
No. 1 railroad wrought	26.50 to 27.50
No. 1 yard wrought	21.00 to 22.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	17.00 to 18.00
Machine-shop turnings	14.50 to 15.00
Cast iron borings	16.50 to 17.50
Heavy axle turnings	15.50 to 16.00
Blast furnace borings and turnings	13.50 to 14.50
Forged scrap	14.00 to 15.00
Bundled skeleton	14.50 to 15.50
Steel car axles	27.00 to 28.00
Car wheels	31.00 to 32.00
Machinery cast	33.00 to 34.00
No. 2 cast	31.00 to 32.00
Stove plate	23.00 to 24.00
Railroad malleable	22.00 to 23.00
Rerolling rails	28.00 to 29.00

Cincinnati

CINCINNATI, Jan. 20.

Pig Iron.—The market was very active last week with most of the sales for prompt and second quarter shipment, though a few small orders were booked for second half. A Southern furnace was in the market last week and disposed of 8000 tons at $38 furnace, while another interest disposed of 5000 tons at the same figure. These prices have been withdrawn and $40 substituted. Both these producers are reported to have a considerable tonnage of prompt iron available, one of them having recently blown in another furnace, the output of which had not been contracted for. A sale of 1000 tons of Southern No. 2 foundry to a consumer in this territory is noted at $40 Birmingham. Virginia furnaces are reported to be booking orders for second half at $40 furnace, while some small tonnages have been taken on by one southern Ohio furnace at the same

figure. A sale of 300 tons of high silicon iron was reported at $1.50 under the market, but the buyer at the same time undertook to purchase some off iron, which probably accounts for the low prices. Ohio silvery has been advanced $2.50 during the week, and the advanced price has been maintained, one interest disposing of 750 tons at the higher figure. Silvery furnaces which have been out of blast for repairs are expected to blow in shortly. Sales of 4500 tons of Lake Superior charcoal and 4000 tons of Northern foundry iron to Michigan melters are noted. Sales of basic and malleable are negligible and quotations given are nominal. Dealers profess to believe that the peak of the prices wave has been reached for the present, though what the future holds they do not prophesy.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$41.60 to $43.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft	42.85 to 44.85
Ohio silvery, 8 per cent sil.	52.50
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	41.80
Basic, Northern	38.00
Malleable	41.00

Coke.—The coke situation shows very little improvement. Car shortage at the coal mines is the biggest handicap to production. One foundry in northern Ohio has been forced to suspend operations on account of the shortage. Dealers are up in the air over the price question, not knowing whether under the regulations they can charge foundry coke supplied to blast furnace operators at the foundry price, and also whether they must bill their customers on contracts made before the regulations went into effect at the price then prevailing or on the Government schedule. The Illinois Central Railroad has sent out a list of 3454 cars commandeered by it during the coal shortage in the hope that dealers may be able to identify a large number not yet paid for.

Finished Material.—Demand for finished products is very heavy and deliveries are not improving. While jobbers' prices remain the same, advance is scheduled for the latter part of the week. Mills in this vicinity are about four months behind on their orders, and are not quoting on new business. Jobbers quote:

Steel bars, 3.58c.; structural shapes, 3.68c.; No. 10 blue annealed, 4.78c.; cold-rolled rounds, 5.25c.

Old Material.—In the scrap market conditions are fairly active. Dealers report that there is a great scarcity in the country, and that prices have an upward tendency. Local foundries have not been in the market to any great extent, most of the sales being to melters outside this territory. We quote:

Per Gross Ton	
Bundled sheet	$15.00 to $16.00
Old iron rails	26.00 to 27.00
Relaying rails, 50 lb. and up	42.00 to 43.00
Rerolling steel rails	27.00 to 28.00
Heavy melting steel	21.00 to 22.00
Steel rails for melting	22.00 to 23.00
Old car wheels	26.00 to 27.00
No. 1 railroad wrought	23.00 to 24.00
Per Net Ton	
Cast borings	$12.50 to $13.00
Steel turnings	11.00 to 11.50
Railroad cast	29.00 to 30.00
No. 1 machinery	32.00 to 33.00
Burnt scrap	17.00 to 18.00
Iron axles	28.50 to 29.00
Locomotive tires (smooth inside)	21.50 to 22.50
Pipes and flues	16.00 to 16.50
Malleable cast	21.00 to 21.50
Railroad tank and sheet	15.00 to 15.50

St. Louis

ST. LOUIS, Jan. 20.

Pig Iron.—Sales continue in small lots but in considerable numbers, furnaces not being actively in the market for deferred business to any great extent. Inquiry for first half is active from the gray iron melters and there is also considerable inquiry for last half with a few furnaces naming prices. An occasional furnace is also taking business through the year at the first-half price which is generally put at $40 for 1.75 to 2.25 silicon. One sale of basic, 25,000 tons, is reported to have been made by the local furnace to the American Steel Foundries, but both sides refuse to confirm or deny. Business generally is inclined to activity, but held back by indisposition of furnaces to commit themselves very heavily. Considerable selling of coke is reported, mostly for first half, although some transactions have been closed for last half. Figures specific to the transaction are being named with the provision that shipments made during Government control of prices shall be billed at the price fixed by the Fuel Administration.

Finished Iron and Steel.—Heavy demand continues with deliveries showing no improvement. Much more would be taken if the mills were in position to assure delivery at specified dates. No changes in prices have been made. Movement out of warehouse is still up to the capacity of stocks on hand and would be much greater if material were available.

Old Material.—The market is strong, but not so active as last week. Dealers are continuing to speculate among themselves and consumers are also buying, including rolling mill, steel and foundry interests. Rerolling material has sold in especially large quantity and the same is true of old carwheels. Mills are also accepting shipments on old contracts, as they are in need of the materials. Prospects generally are regarded optimistically. Lists out include 300 tons from the Missouri, Kansas & Texas and 1500 tons from the Wabash. We quote dealers' prices, f.o.b. customer's works, St. Louis district, per gross ton, as follows:

Old iron rails	$28.50 to $29.00
Old steel rails, rerolling	34.50 to 35.00
Old steel rails, less than 3 ft.	28.00 to 29.00
Relaying rails, standard sections, subject to inspection	38.00 to 45.00
Old car wheels	33.00 to 34.00
No. 1 railroad heavy melting steel	25.00 to 25.50
Heavy shoveling steel	23.50 to 24.00
Ordinary shoveling steel	22.50 to 23.00
Frogs, switches and guards, cut apart	26.00 to 26.50
Ordinary bundled sheets	16.00 to 16.50
Heavy axle and tire turnings	18.00 to 18.50
Per Net Ton	
Iron angle bars	25.50 to 26.00
Steel angle bars	23.50 to 24.00
Iron car axles	36.50 to 37.00
Steel car axles	35.00 to 35.50
Wrought arch bars and transoms	30.50 to 31.00
No. 1 railroad wrought	25.00 to 25.50
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	23.50 to 24.00
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	24.50 to 25.00
No. 1 dealers' forge	21.50 to 22.00
Cast iron borings	13.75 to 14.25
No. 1 busheling	22.00 to 22.50
No. 1 boiler, cut to sheets and rings	18.00 to 18.50
No 1 railroad cast	33.50 to 34.00
Stove plate and light cast	28.50 to 29.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	25.00 to 25.50
Pipes and flues	19.50 to 20.00
Heavy railroad sheet and tank	19.00 to 19.50
Railroad grate bars	28.00 to 28.50
Machine-shop turnings	14.00 to 14.50
Country mixed	21.50 to 22.00
Uncut railroad mixed	22.50 to 23.00
Horseshoes	24.00 to 24.50

New York

NEW YORK, Jan. 20.

Pig Iron.—A large volume of inquiries for export, including one for 50,000 tons of foundry grades, one for 20,000 tons of foundry grades and one for 5000 tons of low phosphorus, all for Italy, and one for 25,000 tons of basic for England have been received, but there is very little prospect of any considerable tonnage being exported in the near future owing to the scarcity of iron in this country. In fact, there has been some inquiry for Scotch iron and a cablegram to a New York broker announces that it can be delivered in this country at $46.25 for No. 2. Very fair inquiry for foundry grades for domestic consumption is pending and prices show a tendency toward higher levels. In Buffalo, where one maker had been quoting on a basis of $38, $40 is now the minimum. In eastern Pennsylvania, a company is asking $43 furnace for No. 2 plain, but the usual quotation is still $42. A Virginia company is asking $42 and the leading Virginia interest has withdrawn from the market. At Buffalo two Rogers-Brown furnaces are now in operation and one will probably be ready to blow in at an early date, but the fourth will not be ready to blow for several months. Difficulties are being experienced in regard to labor and also in getting cars at Buffalo. Not enough cars have been obtained to move the iron which has been made so that it will be necessary to pile some of it.

The report that owing to the formation of the Wickwire-Spencer Steel Corporation, there will be no more Wickwire foundry iron for sale has little foundation. Selling of foundry iron will continue, but later two open-hearth furnaces may be added to the plant and in that event the company will not have any iron to sell. One effect of the consolidation will be to stop the selling of billets, as the semi-finished steel will be needed by the New England plants of the corporation. We quote delivered New York, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$45.05 to $46.00
No. 2X, sil. 2.25 to 2.75	44.05 to 45.05
No. 2 plain, sil. 1.75 to 2.25	42.80 to 43.80
No. 2X, Virginia, sil. 2.25 to 2.75	44.40 to 45.40

Ferroalloys.—Domestic ferromanganese is extremely scarce with only a limited amount available for delivery in the first half at around $150, delivered. Practically all American producers are out of the market for the first half and have withdrawn temporarily for second half delivery, due to uncertainties as to ore supplies, cost of production and other considerations. For small amounts of alloy for spot delivery anywhere from $150 to $180, delivered, is asked, and some wholesale lots are reported to have changed hands at $150, delivered. The Anaconda Copper Mining Co. will soon be producing electric alloy. The Lebanon furnace of E. J. Lavino & Co. will be operating on ferromanganese this week and later the Sheridan furnace will produce the same alloy. Of the 1500 tons of British alloy, reported a week ago to be available for delivery from April on, 1000 tons have been sold. There is still available the 500 tons mentioned last week at $150, seaboard, for delivery from April on and probably an additional quantity may be offered by another seller at the same price. Manganese ore prices continue to advance and it is now stated that as high as 75c. to 80c. per unit will be paid for high grade ore by American producers of ferromanganese. The future of both the American and British ferromanganese markets seem to depend largely on the ore supply. Spiegeleisen, 18 to 22 per cent; has advanced, the minimum quotation being $47, furnace, with one producer asking $55. Several hundred tons is reported to have been sold to domestic consumers in the last week. Ferrosilicon, 50 per cent, is unchanged at $80 per ton, delivered, and the market is quiet.

Finished Iron and Steel.—With many millions of dollars worth of building projects in the hands of architects, many of them fully financed, a comparatively small amount of structural steel work is being placed. Presumably this is due to apprehension as to the high costs of labor and materials. The Armstrong Cork Co., Lancaster, Pa., has let a 500-ton structural job to the American Bridge Co. The United Fruit Co. will erect an office building in New Orleans, La., taking 850 tons, which has been let to an unnamed bidder. A fabricating contract has also taken 450 tons for an office building in Maiden Lane, New York, for Richmond, Levering & Co. Not a great deal of business in finished steel products is being done, but this is largely due to the continued inability of mills to make definite promises of delivery. A shipbuilding company, in the market for 18,000 tons of plates, has placed a part of the business. Steel bars have been sold at 3.50c., Pittsburgh. Wire nails continue very scarce. One independent producer expects to be able to take some business for May-June delivery if present improvement in operating conditions continues. Export business is lagging because of scarcity of steel. There is a good demand for billets, largely from England, one company having before it this week inquiries totaling about 40,000 tons. Inquiries for equipment from the railroads are not materializing very rapidly. Car builders have before them inquiries from four roads for a total of about 200 passenger cars. The Director General of Railroads has entered into a contract with the Dubuque Boat & Boiler Works of Dubuque, Ia., for a steel transfer barge to be used in connection with the railroad incline at East St. Louis, Ill., for handling freight between the Mississippi River boats and connecting railroads. Rail carbon bars have been used in substitution for soft steel. For reinforcing purposes the sale is noted of a lot of 1000 tons at 3.25c. Pittsburgh basis and other inquiries for round lots are pending.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 3.27c.; shapes, 2.72c. to 2.82c.; plates, 2.92c. to 3.77c., the minimum prices being for indefinite delivery and the higher prices for the first quarter; bar iron, flats, wider than 6 in., 4.07c.; ⅝ and 7/16 in., round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Warehouse Business.—The price situation shows no change from previous quotations, but maximum figures are in keeping with the acute need of manufacturers for materials. Rail deliveries to local jobbers are lagging, and anxiety is expressed over still further delay from bad weather. Industries are reported by some to face a shortage of supplies akin to war months, and it is being predicted that as a result shutdowns will become inevitable in some departments of metal-working manufacturers. Warehousemen continue to receive inquiries for large tonnages. All kinds of supplies are being bought up by one large Pittsburgh manufacturer and shipped back to that point. The demand for wire is especially keen. One request from Pittsburgh is for 1500 tons of spring wire, 10 to 13 gage. Another is from a local maker of mechanical toys for 5 to 6 carloads. For bright basic wire one sale is reported at 10c. Stocks of coppered Bessemer are very short. Sales of sheets are reported up to 8c. on blue annealed, which is in especially strong demand, 8.50c. on black sheets, and 10c. on galvanized. Some high-priced mill shipments of plates are reported to be going at a loss at existing jobbing prices; and in some quarters higher prices are looked for accordingly on bars, structurals and plate. We quote out-of-store prices: Steel bars, 3.52c. to 4c.; structural shapes, 3.47c. to 3.75c.; plates, 3.67c. to 4c.; No. 10 blue annealed sheets, 5.07c. to 5.80c.; 28-gage box annealed black, 6.50c. to 7c.; 28-gage galvanized, 7.75c. to 9.50c.; shafting and screw stock, rounds, 5.15c. to 5.25c.

Cast Iron Pipe.—Sizes from 20 in. down are in most demand and business generally is in a healthy condition. There will soon be two public lettings of interest in this district, as follows: 2000 tons of water pipe and fittings for the city of New Bedford, Mass., on Jan. 22 and 1500 tons of different sized water pipe for Springfield, Mass., on Jan. 27. We quote 6-in. and heavier at $67.30, New York; 4-in., $70.30, with $2 additional for Class A and gas pipe.

Old Material.—Slight advances over those of last week are noted in several items, particularly heavy melting steel, wrought, steel turnings, mixed borings and turnings and stove plate. Labor difficulties have been increased because of the severe weather which has made many workmen refuse to handle the frosted iron. Several eager consumers are paying prices distinctly above the market because of the scarcity, particularly in cast scrap. Several sales from this district have been made to points in Ohio. Prices which brokers and dealers are paying per gross ton, New York, follow:

Heavy melting steel	$21.00 to $21.50
Rerolling rails	30.00 to 31.00
Relaying rails, nominal	47.00 to 48.00
Steel car axles	33.00 to 34.00
Iron car axles	43.00 to 43.50
No. 1 railroad wrought	30.00 to 30.50
Wrought iron track	23.00 to 24.00
Forge fire	16.50 to 17.00
No. 1 yard wrought, long	24.00 to 25.00
Light iron	7.00 to 8.00
Cast borings (clean)	17.00 to 17.50
Machine-shop turnings	15.50 to 16.00
Mixed borings and turnings	15.00 to 15.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	19.00 to 19.50
Stove plate	23.00 to 24.00
Locomotive grate bars	25.00 to 26.00
Malleable cast (railroad)	24.00 to 24.50
Old carwheels	34.00 to 35.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$35.00 to $36.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	34.00 to 35.00
No. 1 heavy cast, not cupola size	25.00 to 26.00
No. 2 cast (radiators, cast boilers, etc.)	25.00 to 26.00

Philadelphia

PHILADELPHIA, Jan. 20.

Slightly better production at some of the Eastern mills is reflected in buying of scrap, more than 50,000 tons of heavy melting steel having been purchased in the past week by four mills. The demand for pig iron is somewhat quieter, but a fair amount of buying for forward delivery is going on. Some consumers are covering for third and fourth quarter at present prices for spot iron. Two Eastern furnace companies have advanced the price of foundry iron $1 a ton.

Steel companies are engaged mostly in fighting off business which consumers are trying to force upon them. One large company is out of the market on plates and shapes and others are virtually so. Prices for heavy sheared plates range from 3.50c. to 3.75c., Pittsburgh, while for light plates, under ¼ in., 4c., Pittsburgh, has been freely paid where consumers could get desirable delivery. Soft steel bars from mill have been sold at 4.25c., base, Pittsburgh, and a tonnage of bars re-rolled from shell billets brought 4c., Pittsburgh. Sheets, wire products and pipe are not to be had. A Chicago buyer has come to this market seeking sheets, having visited nearly all of the producing centers of the country without success. Jobbers' stocks are rapidly becoming exhausted without prospect of being fully renewed. England is trying to buy wire rods in this country.

Pig Iron.—The Eastern pig iron market is slightly easier so far as demand is concerned, but this is not reflected in any lowering of prices. On the contrary, at least two furnace companies have advanced prices of foundry grades $1 a ton, making 1.75 to 2.25 per cent silicon iron $43, furnace, and 2.25 to 2.75 per cent silicon iron, $44.25. This latter grade has been sold at as high as $46, furnace. Some Buffalo iron, however, has been coming into parts of the Eastern territory at prices lower than the Eastern furnaces are quoting. Some Buffalo furnaces are asking $40. furnace, for the 1.75 to 2.25 per cent silicon grade, with usual differentials for higher silicon, and where the freight rate is not too high they have succeeded in getting the business. One Buffalo furnace is reported to have sold at $38, furnace, for No. 2 plain. No sales of basic are reported, but most of the furnaces are holding for $40, furnace. A local consumer of low phosphorus iron has bought 5000 tons of iron bearing only a little copper. The price is said to have been $46. For copper-bearing iron, standard specification, $45, furnace, is quoted, and a maker of copper free iron is quoting $50, furnace, though last sales were made at $48 and $49. Malleable is scarce. A central Pennsylvania consumer bought 500 tons from an Ohio furnace at $46, delivered. A Virginia maker of foundry iron has sold 8000 tons in the past week or two at $41.50. furnace, for No. 2 X and $43 for No. 1 iron, 2.75 to 3.25 per cent silicon.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2X, 2.25 to 2.75 sil.	$44.35 to $45.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	43.10 to 44.10
Virginia No. 2X, 2.25 to 2.75 sil.	45.35 to 45.60
Virginia No. 2 plain, 1.75 to 2.25 sil.	44.10
Basic deliv. Eastern Pa.	39.25
Gray forge	40.50 to 41.50
Standard low phos. (f.o.b. furnace)	48.00 to 49.00
Malleable	46.00
Copper bearing low phos. (f.o.b. furnace)	45.00

Ferroalloys.—Ferromanganese is scarce for first half. Owing to the difficulty of shipping ore from Brazil, there is not sufficient ore in sight to justify the blowing in of more furnaces. Foreign alloy is quoted at $140, seaboard, and the domestic at $140, delivered. Spiegeleisen is quoted at $45 and higher, the market here being inactive.

Coke.—More merchant furnaces would go into blast were it not for the scarcity of coke. Government fixed prices still prevail and probably will remain in effect until the adoption of the peace treaty nullifies the Lever bill.

Semi-Finished Steel.—We still quote open hearth rerolling billets at $55, Pittsburgh, with a $4.10 freight rate to Philadelphia, and forging billets at $65, Pittsburgh, but small lots from mill stocks have brought $5 above these prices.

Plates.—There is no apparent relief in the plate situation. One Eastern mill last week turned down fully 40,000 tons. Shipbuilders are eager to place large tonnages and in some instances have had extreme difficulty in finding mills willing to take even a portion of what they have to offer. The oil industry also calls for large tonnages. A number of mills are entirely out of the market or are merely taking care of their old trade in a limited way, so that there are virtually no plates for the open market. Prices for sheared plates range from 3.50c. to 3.75c., Pittsburgh, on over ¼ in., while lighter gages have brought 4c. Railroad buying has started in a small way, but it is expected that this movement will expand as the date approaches for the return of the roads to private operation. Production is slowly increasing, but it will be months before some of the mills are caught up with their obligations. The demand for light plates has been so heavy, owing to the inability of consumers to get sheets, that only a small fraction of the total amount offered is accepted. We quote sheared plates at 3.75c. to 4c., Philadelphia, the freight rate on finished steel from Pittsburgh now being 25c. per 100 lb., an advance of ½c.

Structural Material.—Although a great deal of building work is being held back, the mills rolling shapes have more business than they can take care of and prices are advancing. One mill names a new price of 3c., Pittsburgh, an advance of $9 a ton, while another is asking 3.50c., mill. Two or three months is the best that can be done on deliveries and in a majority of cases even more time is required.

Old Material.—Four Eastern steel companies have come into the market for heavy steel scrap within the past few days and have bought a total of 50,000 tons or more. With one exception the price paid was $25, delivered. The one exception is a mill which buys through a New York dealer, who is offering $23, delivered eastern Pennsylvania. Local dealers have sold steel for shipment to the Pittsburgh and Cleveland districts, where much higher prices have been paid. A Cleveland consumer is reported to have paid $29, a Youngstown steel company $27.50 and a steel company in the Pittsburgh district has also paid $27.50. Other grades of scrap are much higher, particularly carwheels, which are quoted at from $38 to $40; No. 1 cast at $38 to $39, and railroad wrought at $34 to $36, and rerolling rails at $36 to $38. We quote prices for delivery at consumers' works, eastern Pennsylvania, as follows:

No. 1 heavy melting steel	$25.00
Steel rails rerolling	$36.00 to 38.00
No. 1 low phos., heavy, 0.04 and under	30.00 to 32.00
Car wheels	38.00 to 40.00
No. 1 railroad wrought	34.00 to 36.00
No. 1 yard wrought	29.00 to 30.00
No. 1 forge fire	19.00 to 20.00
Bundled skeleton	19.00 to 20.00
No. 1 busheling	22.00 to 23.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings (for blast furnace use)	17.50 to 18.50
Machine-shop turnings (for rolling mill and steel works use)	19.00 to 20.00
Heavy axle turnings (or equivalent)	21.50 to 22.50
Cast borings (for rolling mills)	23.00 to 24.00
Cast borings (for chemical plant)	25.00 to 27.00
No. 1 cast	38.00 to 39.00
Railroad grate bars	29.00 to 30.00
Stove plate	27.00 to 28.00
Railroad malleable	28.00 to 29.00
Wrought iron and soft steel pipes and tubes (new specifications)	23.00 to 24.00
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

Bars.—A large steel company has sold soft steel bars at 4.25c., base, Pittsburgh. Bars rerolled from shell billets have brought 4c. A few mills are taking care of regular trade in a very small way, but a consumer having no regular source of supply finds it next to impossible to buy any material at all, except from mills rerolling from shell billets or old rails. Bar iron is in good demand at 3.50c., Pittsburgh.

Sheets.—Consumers of sheets are scouring the country with little or no success. Jobbers' stocks have in many instances reached the vanishing point, with no prospect of replenishment in the near future. A local mill rolling blue annealed sheets has enough business for several months and probably will not book any more orders until May.

Cleveland

CLEVELAND, Jan. 20.

Iron Ore.—The activity in pig iron is expected to cause an early buying movement in ore, and prices may be named within a week or two. There is a general feeling in the ore trade that prices should be advanced $1 a ton, and some consumers have expressed an opinion that this would be a fair advance. There is a probability that vessel rates on ore will be advanced 20c. a ton the coming season, thus restoring the 1918 rates. Virginia furnaces have bought round lots of resale Lake Superior ore to use in place of Southern ore in order to increase their production because of the heavy demand for foundry pig iron. This resale ore has apparently about all been cleaned up. We quote 1919 prices as follows:

Old range Bessemer, $6.45; old range, non-Bessemer, $5.70; Mesaba Bessemer, $6.20; Mesaba non-Bessemer, $5.55.

Pig Iron.—There is a heavy volume of inquiry, particularly from the automobile foundries, for pig iron for the last half, and Cleveland interests during the week made sales aggregating approximately 100,000 tons for that delivery in foundry and malleable grades. A 10,000-ton lot was taken by a Michigan melter and there were many other sales of lots from 1000 to 5000 tons. The market is very firm at $40 for No. 2 foundry and $40.50 for malleable for the last half and leading producers are opposed to further price advances. Melters, especially those engaged in automobile work, are showing a great deal of anxiety to get under cover, fearing that there will not be sufficient iron to go around during the last half, and among the inquiries for that delivery is one from a Michigan foundry for 25,000 tons. One seller who has taken on some last-half business has temporarily withdrawn from the market, not being inclined to book more tonnage until some definite information can be had as to last-half costs, particularly of ore and fuel. There is considerable inquiry for foundry iron for the second quarter from consumers who need additional tonnage, but little is available. Early shipment foundry iron is getting scarcer and small lot sales are being made at $41. Off basic iron is being freely taken by foundries unable to buy standard grades. A Valley interest has sold 1500 tons of basic iron to a consumer at $40 per ton for January and February delivery, this being an advance of $3 over previously reported sales. Another basic sale was 1000 tons per month to a Northern Ohio plant for the first half at prices prevailing at time of shipment. Another consumer is negotiating for 5000 tons of basic per month for the last half. Low phosphorus iron has become more active and has advanced $2 a ton, sales being made at $45 and $46. Toledo A furnace, which had been out for some time for relining and repairs, was blown in Jan. 16. Southern pig iron is firm and active. We note sales aggregating several thousand tons of foundry iron at $40 for 1.75 to 2.25 silicon and $41.25 to $41.60 for 2.25 to 2.75 silicon, the $41.25 price being for Tennessee iron. No furnaces are quoting beyond the first half. A few sales of off Southern iron are reported at $37.50 to foundries that will use it in the place of scrap because of the high price of cast scrap. We note the sale of four lots aggregating 2400 tons of Southern charcoal iron in the Pittsburgh territory at $50, or $5 above recent quotations. Southern Ohio makers have advanced prices on silvery iron and Bessemer ferrosilicon $2.50 per ton, now quoting silvery at $52.50 for 8 per cent silicon and Bessemer ferrosilicon at $62 for 10 per cent. $65 for 11 per cent and $68.60 for 12 per cent. Malleable iron in thousand-ton lots has sold at $41.25 for the last half, although one producer is quoting $40.50. There are two new basic inquiries from northern Ohio consumers, one for 30,000 tons and the other for 15,000 tons for the last half. We quote delivered Cleveland as follows:

Basic	$40.40
Northern No. 2 foundry, sil. 1.75 to 2.25	40.40
Southern foundry, sil. 2.25 to 2.75	$46.25 to 46.60
Gray forge	39.40
Ohio silvery, sil. 8 per cent	54.90
Standard low phos., Valley furnace	45.00 to 46.00

Finished Iron and Steel.—The shortage of finished steel is becoming more acute every day, and higher prices are being paid for material for early delivery. With many consumers it is not a question of getting material. Consumers are attempting to place large tonnages of steel bars, plates and structural material, but without success. Considerable steel, some in round lots, is being sold in this territory from a Chicago warehouse and some structural shapes are being shipped by Eastern warehouses. One Eastern mill which has been selling structural shapes at 3c. has withdrawn from the market. A local mill is again booking orders after advancing prices to 3.50c. for plates, 4.75c. to 5c. for blue-annealed sheets and 6c. for black sheets. One mill is taking second quarter business at 2.50c. for bars, 2.75c. for plates and 2.60c. for structural material, but most quotations are on a higher basis. Few sheets are available for early shipment, and wide spreads in prices are reported up to 7.50c. for blue annealed and 8c. for black and galvanized sheets. A buyer, so far without success, is trying to place 32,000 tons of blue-annealed sheets for export. Some of the large sheet mills will shortly begin shipments on orders taken subject to prices prevailing at time of shipment and will have to decide what is the present market price. Local warehouses are practically out of stock on nearly all lines and nominal warehouse prices are in most cases lower than mill prices. Some warehouses are not attempting to adjust their prices to the advancing market, but are selling such material as they are able to buy from mills, their selling prices depending on what they have to pay for the material. These warehouse prices are as high as 4c. to 6½c. on steel bars. There is a very heavy unsatisfied demand for sheet bars. In structural work the Pittsburgh-Des Moines Steel Co. has taken 270 tons for an erecting shop addition for the Thew Automatic Shovel Co., Lorain, Ohio, and an inquiry is pending for 1100 tons for a garage for the Tenburch Realty Co., Cleveland.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is heavy and a number of manufacturers with orders carried over from last year and with first-quarter contracts will be unable to take on but a limited amount of additional business for the first half. The Ford Motor Co., which recently inquired for 87,000,000 nuts, has distributed orders covering its requirements among a number of manufacturers. Railroads are specifying somewhat more freely. The rivet market is very firm. Manufacturers are crowded with orders and state that with consumers it is now not a question of price but deliveries. Local makers quote rivets at 4.15c. Pittsburgh for structural and 4.25c. for boiler rivets.

Coke.—The shortage of foundry coke has become acute. Shipments are only about 50 per cent of normal owing to the car shortage and labor situation. Many foundries are trying to buy spot shipment coke, but none is being offered for any delivery. Blast furnaces are also suffering from scarcity of coke and the stack of the Struthers Furnace Co. was banked three days last week because of lack of fuel.

Old Material.—The scrap market is very active and nearly all grades are higher. Heavy melting steel, borings and some other grades have become scarce. Some dealers have sold out their yard stocks and others are holding for higher prices. Heavy melting steel scrap is moving at $27 and higher in Cleveland and sales are reported to Valley mills at $28. Several of the Valley mills are buying heavy melting steel and Valley dealers are paying $27.50 for this grade. Sales of borings are reported at $19.50 to $20 in the Valley and this scrap is being quoted as high as $21. One Valley mill has purchased a round tonnage of turnings and there is a good local demand for short turnings for blast furnaces. Foundry cast scrap has advanced from $3 to $4 a ton.

We note the sale of 500 tons of busheling at $22.50. Dealers quote delivered consumers' yards in Cleveland and vicinity, as follows:

Heavy melting steel	$26.50 to $27.00
Steel rails, under 3 ft	31.00 to 32.00
Steel rails, rerolling	33.00 to 34.00
Iron rails	29.00 to 30.00
Iron car axles	39.00 to 40.00
Steel car axles	34.00 to 35.00
Low phosphorus melting scrap	29.00 to 30.00
Cast borings	19.00 to 19.50
Iron and steel turnings and drillings	15.50 to 16.50
Short turnings for blast furnaces	17.75 to 18.25
Compressed steel	23.00 to 24.00
No. 1 railroad wrought	26.00 to 27.00
Railroad malleable	32.00 to 33.00
Agricultural malleable	26.00 to 27.00
Steel axle turnings	23.00 to 23.50
Light bundled sheet scrap	18.50 to 19.00
No. 1 cast	37.00 to 38.00
No. 1 busheling	22.00 to 23.00
Drop forge flashings, 10 in. and under	22.00 to 23.00
Drop forge flashings, over 10 in.	22.00 to 23.00
Railroad grate bars	30.00 to 31.00
Stove plate	30.00 to 31.00

Limestone Sales Increasing

"Limestone sales are constantly increasing, and it is expected the plant capacity of 1,000,000 tons will soon be reached," announces Fred R. Kanengeiser, vice-president and general manager of the Bessemer Limestone & Cement Co., Youngstown, Ohio, operating properties at Bessemer, Pa. Approximately 800,000 tons of limestone are marketed annually by the company, of which 600,000 tons are purchased for the blast furnaces of the Mahoning and Shenango valleys to be used as blast furnace flux. Combined sales of the four products manufactured by the company, blast furnace flux, agricultural limestone, road-building limestone and cement, will amount to $3,000,000 annually on the basis of to-day's prices, states Mr. Kanengeiser.

The company is issuing $1,000,000 of 7 per cent preferred stock and about $400,000 of common stock, which is to be taken up at par by common stockholders. Proceeds will be used for erection of the cement plant, now under construction, which will cost about $1,000,000, and for necessary working capital. The Bessemer company is capitalized at $3,000,000, equally divided between common and preferred, and with the present issue will have $2,000,000 outstanding, $1,000,000 preferred and $1,000,000 common. Capacity of the cement plant will be 1,000,000 barrels a year. It is expected to place the cement of the company, under the brand "Bessemer," upon the market this year.

Freezing Delays Car Movement

Thousands of cars loaded with slag and other refuse from blast furnaces and steel plants in the Youngstown, Ohio, district are standing on sidetracks with the contents frozen solid and with no men to unload them, according to a railroad authority who accounts in part for the scarcity of cars needed to move coal from the mines. The frozen cars are scattered throughout the Mahoning, Shenango and Beaver valleys. They are loaded largely with by-products of the blast furnaces. Refuse from the steel mills also fills many other open-top cars that could be used for coal transportation. Within the past ten days it has developed that the railroads are losing instead of gaining in the number of cars available for moving coal and coke. The blast furnaces in the Mahoning and Shenango valleys turn out thousands of tons of slag daily. Under present conditions this waste not only threatens to become unmanageable, but to cut down operations in the industry by impairing fuel supply. Freezing of the slag in cold weather enhances the difficulty of the problem.

New Wire Nail Card

A new wire nail card is being prepared by a number of independent wire products makers which will be an entirely new idea in nail price cards and will go into all the differentials. Inequalities in the old card prompted creation of the new one which will make its appearance shortly.

Coal Production at Pittsburgh

The Pittsburgh Coal Producers' Association through its commissioner, R. W. Gardiner, states that coal production in that district has fallen far short of expectations entertained shortly after the settlement of the strike, and the prospect of improvement in the near future is not good. Four principal causes are given for the failure of production during December. These are car shortage, mechanical troubles, labor shortage and the strike. During October, the mines in the Pittsburgh district, with an actual capacity of 4,000,000 tons, ran about 90 per cent, production being about 3,500,000 tons. All these mines were down during November. About the middle of December, the men began to go back to work, but the actual tonnage lost by the strike during December was 1,688,000 tons. After the mines started up, there was a further loss in tonnage of 648,700 tons, due to all of the men on the payrolls in October not reporting for duty. The following table shows the amount of tonnage lost During December, and the principal reasons therefor:

	Tons
Present capacity	3,851,000
Produced	1,232,000
Loss	2,619,000
Strike	1,668,000
Labor shortage	648,700
Mechanical troubles	82,400
Car Shortage	1,999,000
Total	2,619,000

Utilizing Low Grade Ores

WASHINGTON, Jan. 20.—Progress being made by the experiment station of the Bureau of Mines at Minneapolis for devising methods of utilizing low-grade iron ores is described in a review of the work of this and 11 other experiment stations dealing with other matters by Dr. Van H. Manning, director of the bureau. Dr. Manning says that the Minneapolis station has already demonstrated that one process for utilizing the great deposits of manganiferous ores on the Cuyuna Range is metallurgically possible.

"The primary purpose of this station is to devise methods of utilizing low-grade iron ores. It has been estimated that the reserves of low-grade magnetic ores in the State of Minnesota alone amounts to some 40,000,000,000 tons, but until recently these ores have been untouched because no process of treating them profitably had been devised," says Dr. Manning. "Even now only one company is attempting to utilize them. The Minneapolis station has already demonstrated that one process for utilizing the great deposits of manganiferous ore on the Cuyuna Range is metallurgically possible. Work such as this not only stimulated mineral production and helps to make available tremendous resources that are now unused, but it increases the total wealth of the nation and ultimately benefits every citizen."

More Active Furnaces

With resumption Jan. 8 of No. 1 furnace, a 500-ton stack in the Haselton group of the Republic Iron & Steel Co. at Youngstown, Ohio, 22 of 25 furnaces in the Mahoning Valley are active. Before the end of the month it is expected pig iron production will be near maximum capacity. The three idle stacks in the Valley are Grace furnace of the Brier Hill Steel Co., which has been down for relining and is near completion, the Thomas furnace of the Carnegie Steel Co. at Niles, and No. 2 furnace at Hubbard of the Youngstown Sheet & Tube Co.

Grace stack of the Brier Hill company probably held the record among the big producing stacks of the country for length of operation on a single lining, having produced continuously for nearly eight years and turning out over a million tons of pig iron in that time.

The Atlantic furnace at New Castle, Pa., and Hall furnace at Sharon, Pa., of the Republic Iron & Steel Co., are still down. The Republic company is operating its open-hearth department at 90 per cent. and its finishing mills close to 100 per cent. Other district corporations report schedules approaching normal.

Fortieth Anniversary of Rogers, Brown & Co.

The fortieth anniversary of the formation of Rogers, Brown & Co. was fittingly celebrated at Cincinnati on Jan. 8, 9 and 10. All the members of the firm with their representatives throughout the country were present, as well as representatives from all the well-known pig iron producers.

On Jan. 8, at 12.30, a luncheon was served at the Business Men's Club for the members of the firm and representatives, at which it was announced that Standish Meacham, son of D. B. Meacham, had been admitted to membership in the firm. At 6.30 an informal dinner for representatives was given in the Cascade Room of the Hotel Gibson. On Friday, Jan. 9, luncheon was served at the Queen City Club for the guests, members of the firm and representatives, and in the evening at the home of D. B. Meacham, Reading Road, they were entertained at dinner. At this dinner William A. Rogers, founder of the company, traced its progress from the time it was organized in 1880, under the name of Rogers & Trivett, occupying two rooms in the Wiggins Block, until to-day, when it has a large suite of offices in the Carew Building, in Cincinnati, and representatives throughout the leading cities of the East and Middle West. In 1880 Mr. Trivett died and Archer Brown, managing editor of the *Cincinnati Gazette*, was taken into the firm, which has since borne the name of the two early partners. At successive periods different gentlemen who had made good in the service of the company were admitted to membership, and to-day the firm consists of the following members: William A. Rogers, William S. Rogers, W. T. Shepard, Buffalo; D. B. Meacham, J. K. Pollok and Standish Meacham, of Cincinnati, and A. A. Fowler, of New York. The manager of sales is F. W. Miller, of Cincinnati, who has as his assistant J. R. Morehead, and E. Raum is auditor.

At this dinner, also, many speeches were made by guests of the firm testifying to the cordial relations existing between the furnace interests and Rogers, Brown & Co., particular mention being made of the important place occupied by them in co-ordinating the industry in the South by the establishment of uniform grading. Mention was also made of the fact that Rogers, Brown & Co. were the first to establish a testing bureau for iron and steel products, this being accomplished in 1888. This has now been discontinued, as with the growth in importance of the industry the value of a testing bureau has become generally recognized and every plant of any prominence has its own laboratory.

The sessions were concluded on Saturday, Jan. 10, with a luncheon at the Business Men's Club. Some interesting exhibits were shown during the meetings, the one creating the most interest probably being the first circular issued by the company on Jan. 13, 1881, offering for sale about 7000 tons of hot blast foundry and forge irons.

Structure of Mild Steel at High Temperatures

WASHINGTON, Jan. 20.—The Bureau of Standards will soon publish the details of studies made by Henry L. Rawdon and Howard Scott on the "Microstructure of Iron and Mild Steel at High Temperatures." The report will be published as Scientific Paper No. 356.

"The microstructure of iron and mild steel which prevails at high temperatures was studied by means of heat-etching," says an abstract of the report. "The polished specimens were heated *in vacuo* to the desired temperature; volatilization of the metal from the surface is sufficient, together with the volume changes in the critical transformation, to produce an etched pattern on the previously polished surface which records the type of structure existing at that temperature. No change occurs in the type of microstructure upon heating until the temperature of the A_3 transformation is reached. Above this temperature the structure is radically different from that which prevails below. The composition of the metal at the surface of the heated specimen changes considerably during the heating. The extent and nature of the change was determined: it is essentially a decarburization. Such decarburization does not occur until all the carbon is in the form of a solid solution, i.e., until the temperature of the A_1 transformation is passed. The effect of this composition change upon indications of the etching pattern by which the structure is revealed is discussed. This method of heat-etching is sensitive enough to reveal the true structure of the metal in spite of the change which occurs later in the composition of the surface metal.

Westinghouse Opportunities for Technical Graduates

Westinghouse opportunities for technical graduates are very thoroughly explained in an illustrated pamphlet bearing that title, recently issued by the Westinghouse Electric & Mfg. Co. This booklet describes in considerable detail the plan which has been developed by this company for the training of the graduates of technical schools at all of its various works. In the booklet is included a list of prominent Westinghouse men who originally entered employ of the company as graduate students, as well as a complete list of schools from which over 5000 students have entered the employ of the company. Copies of the booklet will be sent to anyone interested on application to the educational department of the company at East Pittsburgh.

New Installations of Baily Brass Furnaces

The Electric Furnace Co., Alliance, Ohio, has recently installed a number of electric furnaces of the Baily type for melting brass and has taken an order from the Roberts Brass Works, Detroit, Mich., for three furnaces, each of 1500-lb. capacity. Another order is from Nitoui & Co., Japan, for a 105-kw. nose-tilting furnace of 1-ton capacity, with a special motor-operated casting table so designed that metal can be poured directly into the molds. A similar furnace, but with three casting tables, has been ordered by the Parrish-Pool Co., Cleveland. The West Virginia Metals Corp. will install two Baily nose-tilting furnaces of 1500-lb. to 1-ton capacity. The Lamson & Sessions Co., Cleveland, has placed an order for a 40-kw. hearth type furnace for heat treating bolts.

The Swedish trade movement in iron and steel, according to *Swedish Export*, still shows a marked tendency toward an unfavorable balance. The total imports of iron and steel, semi-finished and finished, during the first three-quarters of 1919, have amounted to 126,000 tons, as compared with 109,000 tons during the same period of 1918. For the same period our export of pig iron has been only about 64,000 tons, as compared with 138,000 tons between January and September, 1918. The figure for the month of September was the lowest for many years, being only 2713 tons.

At Washington last week arguments were heard before the United States Supreme Court in the case of the Carbon Steel Co., Pittsburgh, against Collector C. G. Lewellyn, for the recovery of $271,062 paid under protest by the steel company as ammunitions tax on profits derived from contracts for shells from the British Government. The case went from the United States Circuit Court of Appeals, which upheld the United States District Court, in deciding that Collector Lewellyn was warranted in collecting the tax.

Recent trade and present inquiries from Japan, according to a Japanese firm, are chiefly for light rails, bars and billets. A large part of the business is for 12 to 14-lb. rails, which are used in narrow gage railroads at mines and on plantations. There is also some inquiry for 45-lb. rails. One exporter dealing chiefly with Japan has shipped about 600 tons of light rails in the past two weeks and has orders placed but not shipped for between 4000 and 5000 tons.

CANADIAN MARKETS

Premiums Freely Paid on Sheets—High Prices on Other Products

TORONTO, Jan. 19.—The premium market prevails in sheets in Canada. Price is not now the determining factor in the trade. It is a question of service and delivery. One Toronto warehouse received a wire this week asking if it were interested in a lot of 500 tons of galvanized sheets at Brooklyn, a lot that was left over from war work. The lot would have to be inspected. The price asked was 9½c. at Brooklyn. After paying freight, duty, exchange, etc., it would cost about 11.80c. Toronto, which would mean that the resale price would be about 13½ to 14c.

Iron and steel bars have been raised $10 a ton at Canadian mills. Warehouses for a long time quoted these at 4.25c., but the prevailing price is now 4.75c.

The United States Steel Products Co. (the selling end in this country of the United States Steel Corporation) is still booking plate at 2.65c., but the delivery schedule is stretched well out toward the last quarter. Customers wanting quicker delivery are doing business with the premium mills. One lot was placed by a jobber here at 3.50c., but higher prices than that are being paid.

In the east, the big plate mill of the Dominion Steel Corporation nears completion, and it is possible that plates may be coming from the rolls there by March. The plant is under contract with the Dominion Government. It will have a capacity of 12,000 tons per month, and will roll from 3/16 to 2¼ in. A width of 80 in. is possible, and a length of 80 ft., if called for. The building is planned in the shape of a T, the top end being devoted to the shearing and storing of plate. Over $5,000,000 will have been expended by the time the plant is ready to proceed with the rolling of plate. The Government has a contract there for 50,000 tons a year for five years at 3.65c. f.o.b. mill.

Officials of the Nova Scotia Steel & Coal Co., including the general manager and vice-president, spent some months in the Old Country, reporting on their return that there was a splendid market, the one thing standing in the way being lack of shipping. It is not unlikely that Scotia interests will become exporters of large quantities of iron ore from their Wabana property.

Canadian Steel Corporation

The Canadian Steel Corporation (the Canadian branch of the United States Steel Corporation) is going ahead with its plant at Ojibway, across the river from Detroit. Plans are under way for 12 furnaces with a daily capacity of from 500 to 550 tons each. At present, work will be started with four of these in commission. It is interesting to note that the foundation work for these 550-ton stacks costs as much now as the completed 250-ton stack before the war. The ore docks will be almost a mile in length, with room for two boats to pass in the channel between them, these docks running at right angles to the river. Koppers by-product coke ovens will be installed. The site of the plant is already laid out with a view of housing at some time a steel city of 25,000 people. Many of the utilities have already been placed on the property.

The Algoma Steel Corporation at Sault Ste. Marie, Ont., made a large addition to its capacity for rolling beams during the year, and is now turning out a beam up to 15 in. An order running into big tonnage has been placed for the structural steel for a large addition to the works at the Soo.

The Steel Co. of Canada has had its new battery of Wilputte coke ovens in operation for some months. It is doing a good export business, and the plant is booked to capacity for six months at least.

Baldwin's, Ltd., the Welsh tin plate interests, took over the plant of British Forgings, with its installation of 10 6-ton Heroult furnaces. It would require 22,000 hp. to operate this plant, and there is going to be so much trouble in securing this that the firm will probably put in open hearths. It had been the original intention to use the electric method and work entirely from scrap. The finishing mill, 900 ft. long, is rapidly nearing completion.

Few people outside of those actually engaged in the business appreciate the development that has taken place during the past 12 months in the Canadian steel industry.

British Prices Still Advancing

Higher Pig Iron Expected—Steel Prices Irregular and Tin Plate Demand Tremendous

(By Cable)

LONDON, ENGLAND, Jan. 19.

The Cleveland pig iron market is strong and a further advance is expected in February. There is a greatly increased export demand and price is a secondary consideration, £10 10s. being freely paid for January-March shipment for Cleveland iron for neutral markets. Makers are fully sold up and refusing further business. The chaos in traffic conditions continues unrelieved.

Prices for steel are very irregular, some makers asking a pound sterling more than others. Demand for tin plate is tremendous with some inquiry from Cuba. Prices are soaring with 63s. paid and up to 65s., basis, asked for fairly prompt delivery. There is talk of as high as 70s. and some buyers are offering 61s. 6d. and even more for October-December shipment. Tin plates for July-September delivery have sold at 66s. There is an inquiry for 600,000 oil sizes for July-October delivery, Wales probably quoting about 64s. f.o.b. Tin plate bars are quoted from £20 upward.

Galvanized sheets are strong, with £48 to £48 10s., basis, paid for April-May delivery. Thin gages are advancing continually with the usual Rangoon specifications sold at £62, September shipment.

The Duffryn Tin Plate Works have been bought by a syndicate in which Bessler, Waechter & Co., Ltd., is largely interested, the price involved having been about £65,000.

Quotations for billets, steel bars, steel hoops, tin plates and galvanized sheets have all advanced since last week's cable. [Changes are recorded below.]

Gebrüder Sulzer, Winterthur, Switzerland, are said to be erecting a blast furnace for treating large Swiss iron ore deposits recently discovered.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at $3.68 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	22	10	0 to	24	10	0	$82.80 to $90.16
Boiler plates	26	10	0 to	29	0	0	97.52 to 106.72
Tees	20	10	0 to	22	0	0	75.44 to 80.96
Channels	19	15	0 to	21	5	0	72.68 to 78.20
Beams	19	10	0 to	21	0	0	71.76 to 77.28
Round bars, ¾ to 3 in.	22	0	0 to	24	0	0	80.96 to 88.32
Rails, 60 lb. and up	18	15	0 to	19	5	0	69.00 to 70.84
Billets	18	10	0				68.08
Steel hoops	28	15	0 to	29	0	0	105.80 to 106.72
Tin plates	0	62	0 to	0	63	0	11.40 to 11.59
Tin plate bars	20	0	0				73.60
Galv. sheets, 24 g.	48	0	0				176.64

The Pittsburgh-Des Moines Steel Co. is making some large additions to its plant on Neville Island, Pittsburgh. Included is a new shop building, 135 x 300 ft., equipped with traveling cranes and other machinery for fabricating steel. The new shop is expected to be completed in about three months, and will have a capacity for fabricating about 1200 tons of steel per month.

No. 2 blast furnace of the Carnegie Steel Co., at Bellaire, Ohio, has been put in operation, and the steel works of this company at Bellaire is now running full, the output of sheet bars being largely used by sheet and tin plate mills of the American Sheet & Tinplate Co., located in the Ohio Valley.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Jan.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
14	19.50	19.25	64.50	8.75	8.50	9.65	9.30
15	19.50	19.25	63.00	8.75	8.50	9.55	9.20
16	19.50	19.25	63.50	8.75	8.50	9.50	9.15
17	19.50	19.25	.....	8.75	8.50	9.55	9.20
19	19.50	19.25	64.25	8.75	8.50	9.60	9.25
20	19.50	19.25	64.00	8.75	8.50	9.65	9.30

NEW YORK, Jan. 20.

The markets are all quiet, but prices are in the main steady. Demand for copper has slackened. The tin market continues to closely follow London transactions and prices are erratic. The insistent demand for lead has fallen off but prices continue firm. Less activity characterizes the zinc market. Antimony is considerably stronger.

New York

Copper.—The market continues very quiet both for domestic and foreign account. Consumers seem to have covered their requirements, for the first quarter at least, as a result of the heavy buying a few weeks ago. Electrolytic copper for early delivery is quoted at 19.25c., New York, with Lake at 19.50c., but demand for either is limited to consumers who need consignments for immediate requirements. These quotations are those of the large producers.

Tin.—The tin market the latter part of last week was fairly active, having been extremely quiet previous to that. The better demand appeared about the middle of the week, and under intensely competitive conditions from 700 to 800 tons is reported to have been sold, largely to certain tin plate makers. The prices, as indicated above, were erratic, following to a certain degree the fluctuating conditions of the London market. Yesterday the market again turned quiet, buyers not being attracted at the advance, sellers offering spot tin at 64.25c., and futures at around 64.50c. To-day, however, there has been more inquiry with futures offered at 64.50c. and lower, spot Straits at 64c. and Banca tin at 63.50c. Arrivals for the month thus far have been 2280 tons, of which 1865 tons is credited to Atlantic ports. The quantity afloat is reported as 6330 tons. The London market continues to advance and has nearly reached the record price of £399 per ton for spot Straits, established in 1917, the present quotation being around £386 per ton.

Lead.—The insistent demand which has prevailed for some time has subsided to a marked degree, but prices continue firm. For early delivery the market may be quoted, more or less nominal, at 8.50c., St. Louis, or 8.75c., New York, with spot unobtainable at less than 8.87½c. to 9c., New York. Last Thursday the American Smelting & Refining Co. again advanced its price ¼c. per lb. to 8.25c., St. Louis, and 8.50c., New York.

Zinc.—This market continues to follow transactions in London but not to the degree obtaining a week or two ago, due partly to the fact that foreign demand for American zinc has fallen off or been satisfied. In the last week quotations fell as low as 9.15c., St. Louis, but since then these have stiffened and to-day prime Western for early and first quarter delivery is quoted at about 9.30c., St. Louis, or 9.65c., New York, with some producers asking not less than 9.37½c., St. Louis. Strikes at some of the Western smelters are a disturbing factor in the future of this market Galvanizers are reported to have been more active recently.

Antimony.—Demand is better and supplies are not as plentiful. As a result quotations are higher, at 10.75c to 11c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged at 31.50c. to 32.50c., New York, in wholesale lots for early delivery.

Old Metals.—The market is firm but not so active. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible	20.00
Copper, heavy and wire	19.00
Copper, light and bottoms	17.00
Brass, heavy	14.25
Brass, light	10.50
Heavy machine composition	19.50
No. 1 yellow rod brass turnings	12.00
No. 1 red brass or composition turnings	16.50
Lead, heavy	7.50
Lead, tea	5.50
Zinc	6.00

Chicago

Jan. 19.—The demand for copper has fallen off, but this is not surprising. Tin is firm and unchanged, although further price advances are looked for. Lead and spelter are strong and are moving in quantity. Whether the claims of a shortage in these metals are founded on fact or not, it is at least certain that offerings are short of the demand. Antimony has shown more activity than for some months. We quote Lake copper 20.50c. for carloads, tin 65c. to 67c., lead 8.50c. to 8.75c., spelter, 9.37½c. and antimony 12c. On old metals we quote copper wires, crucible shapes, 16.50c.; copper clips, 16.50c.; copper bottoms, 15c.; red brass, 16.50c.; yellow brass, 12.50c.; lead pipe, 6.50c.; zinc, 6.50c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 52.50c., all these being buying prices for less than carload lots.

Manufacturers Postpone Meeting

The convention of the Material Handling Machinery Manufacturers' Association at the Waldorf-Astoria Hotel, New York, will be held Feb. 26 and 27 instead of Jan. 29 and 30, as at first announced. The convention will be open to all manufacturers of material handling equipment, including the makers of tractors, trailers and motor trucks. The formal luncheon, Feb. 26, will be addressed by Major-General William M. Black. During the two days motion pictures will be shown of the latest and largest installations of material handling machinery.

Chain Company Buys Bar Mills

The American Chain Co. has purchased the bar iron mills of the Highland Iron & Steel Co. at Terre Haute, Ind., and West Pullman, Ill., which has an annual capacity of 50,000 tons of iron and steel merchant bars and special shapes.

Reports that the American Bridge Co., Pittsburgh, would build a large new fabricating plant in the Central West district are incorrect. More than a year ago this company bought about 100 acres, about 50 miles from Pittsburgh, fronting on the Monongahela River, with the intention of building a fabricating plant. However, on account of the war and for other reasons the project has not been taken up actively, and likely will not be for some time.

The recent increase in the capital stock of Eagan-Rogers Steel & Iron Co., Crum Lynne, Pa., from $85,300 to $111,300 was to take care of equipment of the company's new machine shop, which has now been equipped so that it can take care of orders for machined steel castings.

The United States Steel Corporation has given its employees an opportunity to subscribe for the common stock of the company at 106. The number of shares subscribed for in past years has been: 1916, 50,269; 1917, 67,752; 1918, 96,645; 1919, 60,741.

The Union Tank Car Co. has acquired a 125-acre site in Lima, Ohio, for a large plant for building tank cars. It is expected that contracts for the plant will be placed shortly.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c. Indianapolis, 25c. Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload, 40,000 lb.; and $1.25 minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots. 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not quoted above rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3 to $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.10 base
Large boiler rivets.....$4.20
Small rivets, ¼ in., 5/16 in. and 7/16 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, ⅜ in. x 4 in.:
  Smaller and shorter, rolled threads.50 and 10 per cent off list
  Cut threads .....50 per cent off list
  Larger and longer sizes.....40 and 5 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
  Smaller and shorter.....40 and 5 per cent off list
  Larger and longer.....35 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
  Smaller and shorter, rolled threads.45 and 5 per cent off list
  Cut threads .....40 and 5 per cent off list
  Larger and longer sizes.....30 and 10 per cent off list
Lag bolts .....50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3.....50 per cent off list
Plow bolts, Nos. 4 to 10.....50 plus 20 per cent off list
Hot pressed nuts, sq. blank.....2.50c. per lb. off list
Hot pressed nuts, hex. blank.....2.50c. per lb. off list
Hot pressed nuts, sq. tapped.....2.25c. per lb. off list
Hot pressed nuts, hex. tapped.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank....2.50c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped...2.25c. per lb. off list
Semi-finished hex. nuts:
  ⅝ in. and larger.....65 per cent off list
  9/16 in. and smaller.....70 and 10 per cent off list
Stove bolts in packages.....75-10 per cent off list
Stove bolts in bulk.....75-10-2½ per cent off list
Tire bolts .....60-10 per cent off list

The above discounts are from Nov. 1, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $65; chain rods, $65 to $70; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ in., 9/16 in. and larger, $3.35 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅜ in., 7/16 in. and smaller, $3.85 to $4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, $4.90 to $5.00 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Boat and barge spikes, $3.85 to $4 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 2.75c. from mill. Bar iron, 3.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	50½	24	⅛ and ¼	29½	2½
½	54½	40	⅜	30½	3½
¾ to 3	57½	44	½	34½	16½
			¾ to 1½	30	23½

Lap Weld

2	50½	38	1¼	24½	9½
2½ to 6	53½	41	1½	31½	17½
7 to 12	50½	37	2	32½	18½
13 and 14	41	..	2½ to 6	34½	21½
15	38½	..	7 to 12	31½	18½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	46½	29	⅛, ¼ and ⅜	28½	11½
½	51½	39	½	33½	20½
¾ to 1½	55½	43	¾ to 1½	39½	24½
2 to 3	56½	44			

Lap Weld, extra strong, plain ends

2	48½	37	1¼	25½	10½
2½ to 4	51½	40	1½	31½	17½
4½ to 6	50½	39	2	33½	20½
7 to 8	46½	33	2½ to 4	35	23½
9 to 12	41½	28	4½ to 6	34½	22½
			7 to 8	26½	14
			9 to 12	21½	9½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	3½ to 4½ in.	—16
2½ to 3¼ in.	30½	3 to 3½ in.	— 1½
2¼ in.	24	2½ to 2¾ in.	+ 1
1¾ to 2 in.	19½	2 to 2¼ in.	+10
		1¾ to 1⅞ in.	+20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carload and larger lots are as follows, but large premiums are being paid for anything approaching prompt delivery:

Blue Annealed—Bessemer

	Cents per lb.
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55

Galvanized, Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30½ and 31	4.45

BUILDINGS FOR JAPAN

Contracts Placed in This Country Will Call for Considerable Steel Tonnage

The George A. Fuller Construction Co., New York, has closed contracts in Japan for the construction of modern hotels, apartment houses and office buildings, totaling about $5,000,000. Hoists and other machinery are expected to cost about $150,000, but some of this as well as a portion of the structural steel required may be purchased in England.

A large inquiry is in the market from Japan for structural steel. Another inquiry of generous proportions is from the Japanese Government for 90-lb. rails for the Imperial Railroads. The demand for semi-finished material from Japan is heavy, but present prices are preventing the placing of many orders.

A large export firm recently sold to an English company 2000 boxes of tin plate, American tin plate now selling below the domestic product in England. This exporter ascribes the purchase to the recent English dumping of tin plate in South American markets and Japan, which has probably created a shortage.

The street railway of Kobe, Japan, according to announcement of the Imperial Railway Board, is to be elevated for a distance of several miles. In addition, if present plans are followed, a 138-ft. promenade will be constructed on each side of the elevated railroad. The work, estimated at about $13,000,000, will cover about five years. Tokio newspapers announce that plans are under consideration for the construction of a subway system in the city of Tokio.

Furukawa & Co., exporters and representatives of the Furukawa Mining Co., in the United States, have made the first shipment of structural steel to Japan for their new seven-story building in Tokio.

Quotations F. O. B. Export Vessel

The American Chamber of Commerce in London advises American exporters to make their f.o.b. quotations mean "Free on board export vessel" in order to obviate misunderstandings which will react against the future business in the United States. F.o.b. quotations in the United States and Great Britain do not necessarily mean the same thing.

Inquiries from England and Belgium

Semi-finished steel is still a large item in export demand. One company in a week has received inquiries from England totaling about 40,000 tons of billets.

Besides the 15,000 coal cars of 20 tons capacity on which bids are asked on Jan. 21 by the State Railways of Belgium, bids are also asked on 3000 flat cars of 20 tions mean "Free on board export vessel" in order to partment for parcels and also with an elevated lookout box. The American consulate at Brussels intimates that possibly the date may be extended, but probably only on cabled request.

New England Foundrymen's Association

The New England Foundrymen's Association held its twenty-fifth annual meeting at the Exchange Club, Boston, on the evening of Jan. 14. It was one of the largest attended affairs of its kind in several years.

The following officers were elected for 1920: A. B. Root, Hunt, Spiller Mfg. Corporation, Boston, president; C. E. Hildreth, Whitcomb-Blaisdell Machine Tool Co., Worcester, vice-president; George H. Gibby, Gibby Foundry Co., East Boston, treasurer; Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, secretary.

Following the business meeting there was an informal reception by outgoing and incoming officers. Dinner was served shortly after 6 o'clock, during which much good music was enjoyed.

The speaker of the evening was Sherman Rogers, New York. His topic was "The Sane Solution of the Present Industrial Unrest." He told those present that the only way to solve the problem was for the employer to give all the facts of his business to his employees, instead of allowing the labor leaders and agitators to do it for him. He said the agitator always played up the wrong side to labor, and that labor, hearing only that side, naturally believed it. Mr. Rogers believed that if it is necessary the employer should publish in his shop a true statement of his earnings and expenses. In other words, he believes the employer should show every confidence in his labor. He gave numerous instances where important corporations are following this course and having pronounced success in the handling of labor, the Hydraulic Pressed Steel Co. being a case in point. Members of the association agreed that Mr. Rogers' argument was an interesting one and that he was one of the most entertaining speakers that has come before the organization during the past year.

Weirton Steel Co. Buys Coke Plant

A deal was put through at Pittsburgh last week by which the Weirton Steel Co. and E. W. Mudge & Co. bought from the Hillman Coal & Coke Co. what is known as the No. 1 plant of the Thompson-Connellsville Coke Co., which is located in the Klondike region, which is a part of the Connellsville region. The plant contains 400 beehive ovens, with a capacity for making about 25,000 tons of coke per month, and also has an additional capacity of 15,000 tons of coal per month. There was also involved in the deal about 1000 acres of undeveloped coal lands in an adjacent field, and the supply of coal in sight is estimated to be large enough to operate the 400 ovens for a period of 20 years. The Weirton Steel Co. and E. W. Mudge & Co. bought this coke property mainly for the purpose of having their own supply of coke for the new blast furnace of the Weirton Steel Co. at Weirton, W. Va., started last summer. The new property will be operated by the Weirton Steel Co. and E. W. Mudge & Co., under the name of the Redstone Coal & Coke Co., an identified interest of the two concerns named above.

Will Build Large Shipbuilding Plant

The Globe Shipbuilding & Dry Dock Co. of Maryland is to be organized at Baltimore and an immense plant comprising 30 acres established at Fairfield, near Baltimore. The business of the Globe Shipbuilding & Dry Dock Co., Superior, Wis., will be removed to the new location and the activities greatly enlarged.

An official statement in connection with the plans says:

"The Globe Shipbuilding & Dry Dock Co. of Maryland will erect a modern shipbuilding and dry dock plant at Fairfield, occupying 30 acres, with deep-water frontage of about 1000 ft. extending back about 2300 ft. to the tracks of the Baltimore & Ohio Railroad. The plant will include excavated slips sufficient to hold an 8000-ton lift capacity floating drydock, berths, marine railway, including other wharves with practically 4000 feet of dockage, with necessary buildings and machinery capable of employing 2000 men when operating at full capacity.

Inquiry from South American markets lately has been heavy for galvanized sheets and galvanized plain and barbed wire. An exporter has shipped an order of 800 tons of reinforcing steel to Cuba, and between 3000 and 4000 tons of 8 to 45-lb. rails to the Philippines for use on plantations.

Scandinavian countries are now inquiring for 30,000 tons of 14 to 90-lb. rail. An exporter with a branch office in Copenhagen reports business there dull, caused chiefly by threatened strikes and lockouts, coupled with the favorable exchange rate with Germany.

Surveys are now in progress in the Dutch East Indies for large extensions to the railroads.

Surplus Machine Tools Sold

WASHINGTON, Jan. 20.—Two sales of machine tools have recently been concluded by the War Department to the Lafayette Motors Co., Indianapolis, and the Austin Mfg. Co., Harvey, Ill. The two sales are pronounced by the Director of Sales of the War Department as "very successful." The Lafayette Motors Co. purchased two Natco multiple drills for $5,450 and 41 machine tools, mostly lathes and milling machines, for $36,394. The Natco drills were purchased from the Ordnance Salvage Board through the district office at Cleveland. The other machines were purchased from the Air Service.

Total sales by the War Department for the week ended Jan. 9 amounted to $12,847,818.95. The largest total for the week was $8,564,932.50, which represented the receipts from the smokeless powder plant at Nitro, W. Va. O. F. S.

Announce New Quick Change Engine Lathe

Twenty-four changes of threads and feeds without change of gears is provided in a new engine lathe added to its line by the Worcester Lathe Co., 100 Beacon Street, Worcester, Mass. The threads range in half steps per inch from 4 to 8, single steps from 8 to 16, and double steps from 16 to 30 inclusive. Four change gears are provided, a 64-tooth gear for cutting from 32 to 60 threads per inch in sets of four, a 24-tooth gear for cutting 3 threads per inch, a 46-tooth gear for 11½ threads and a 54-tooth gear for 27 threads per inch. Change of gears, it is stated, can be made in one minute or less.

Other gears for cutting threads such as 2, 17, 19, 25, 64, 75 per inch, etc., and other unusual threads can be furnished. Translating gears for cutting metric pitches such as ¾, 1, 1½, 2, 3, 4, 6 and 8 mm., also translating gears for cutting usual threads per centimeter can be supplied.

Canadian Car Changes

Anticipated developments in the affairs of the Canadian Car & Foundry Co., Montreal, Que., were effected at the meeting of the company, held Jan. 15. Four new directors were elected: W. H. Woodin, president American Car & Foundry Co.; Andrew Fletcher, president American Locomotive Co.; Lewis L. Clarke, president American Exchange National Bank, New York, and Francis H. Clergue, Montreal, Que. Two of the former directors, Erskine Hewitt and J. Fraser Taylor, as President W. W. Butler stated, magnanimously tendered their resignation to make room for the new interest's representatives. In his address Mr. Butler dwelt at some length on the importance of the new alliance with the powerful companies working in kindred and similar lines to the Canadian Car & Foundry Co.

War Forgings Sold

Maxim Karminski, president Steel Producers' Export Co., New York, closed a deal Jan. 3 with the Artillery Department of the French High Commission for about 15,000 tons of shell and gun forgings produced during the war for the French Government and packed ready for shipment to France. The purchase was made with the intention of reselling for export, but interests in Ohio acquired it within 48 hours after its purchase by the Steel Producers' Export Co.

Machinery Firm Buys Property

S. Nemirovsky & Son, dealers in machinery and tools, 136 North Third Street, Philadelphia, have purchased for office and showroom purposes a five-story building at 137 North Third Street, which will be occupied as soon as alterations are completed. The firm also has bought an adjoining building, which will contain its repair department, storage and garage, thus centralizing all its departments.

The Moore Drop Forging Co., Springfield, Mass., is to build a one-story, 158 x 91 ft., addition to the administration building.

OFFICE CHANGES

The Joy Machine Co., 7 West 10th Street, Wilmington, Del., engaged in the general machinery business, has opened an office at 1203 Oliver Building, Pittsburgh. J. F. Joy is vice-president and Don Rose, secretary.

A. C. Warner Co., 832 Market St., Wilmington, Del., which manufactures and deals in machinery and supplies, has opened an office in the Bulletin Building, Philadelphia. A. C. Warner is president and A. B. MacFarland is secretary.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has underway a new mill for rolling pipe from 4 to 10-in. in diameter, and designed to turn out about 50,000 tons per month. Foundations are in, but owing to delays in construction on account of cold weather and for other causes, the plant will not likely be ready to operate before July.

The General Combustion Co. announces the removal of its Philadelphia office from the Real Estate Trust Building to the Finance Building, also the addition of a new department, known as the Continental Industrial Engineers, doing general industrial engineering, which will also be under the direct supervision of W. H. Rue, district manager.

The L. Best Co., distributor for the Sterling wheels, manufactured by the Sterling Grinding Wheel Co., Tiffin, Ohio, has recently purchased a building at 28-30 West Broadway, New York, and moved its store into ample space for its increased business.

The Duff Mfg. Co., Pittsburgh, announces the opening of a branch sales office in the Book Building, Detroit, in charge of Frank J. Hunt. This new office will handle the output of the forge department of the company.

Stone & Webster, Boston, have established temporary offices at 820 Hotel Statler, Cleveland, and will shortly open permanent headquarters in that city at 208 Leader-News Building. G. E. Chamberlain, formerly at Youngstown, Ohio, and Chicago, is in charge. Stone & Webster have at present contracts for buildings for the Mechanical Rubber Co. and for the Joseph & Feiss Co., Cleveland, and for the Mullins Body Corporation, Salem, Ohio.

The Hammond Mfg. Co. has removed its office from 336 Frankfort Avenue, Cleveland, to 6545 Carnegie Avenue. Its factory is at 2139 Hamilton Avenue.

The Hammond Steel Co., Inc., Syracuse, N. Y., announces that it has opened a new office in Detroit with S. M. Wetmore representing it as district sales agent at No. 912-915 Kresge Building.

The Consolidated Steel Corporation, 165 Broadway, New York, recently installed its Paris office at 69, rue Lafayette.

The Lewis-Shepard Co., 48 Binford Street, Boston, has removed to 568 East First Street.

The Department of Labor, New Jersey, has completed the compilation of statistics showing the advance of wages of workers in industrial lines from 1914 to 1918. Twenty-five typical state industries were selected for the estimates, including the following: 174 machinery plants report a 93.6 per cent annual advance per worker; in 16 steel and iron forging plants, the average income advanced from $712 to $1,334 per year; 19 wire drawing and wire cloth plants show an annual pay roll total of 120.5 per cent larger per worker than previous to 1914; 14 steam boiler manufacturing plants report an advance of 115.2 per cent in employees' average annual earnings; structural steel and iron workers show an increase of 92 per cent in wages between 1914 and 1918, or $603.14 and $1,158.03 per annum respectively.

Machinery Markets and News of the Works

LIST OUT FOR AUTO PLANT

H. H. Franklin Mfg. Co. Inquires for About $200,000 Worth of Tools

Railroads in the Market at Chicago—Purchases by Henry Ford & Son at Cleveland for Tractor Works

The H. H. Franklin Mfg. Co., Syracuse, N. Y., which is about doubling the capacity of its plant, is in the market for about $200,000 worth of machine-tool equipment. This is the largest inquiry now before the Eastern trade. Another Syracuse concern, the Dyneto Electric Co., also has expansion under way which will require considerable machine-tool equipment. The General Electric Co., Schenectady, N. Y., has new inquiries out for about 30 machines. The Savage Arms Corporation, Utica, N. Y., is inquiring for tools for the manufacture of ball bearings.

One of the large buyers of the past week is the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., which has closed for considerable metalworking and woodworking machinery from its purchasing office in New York.

Two railroad lists are before the trade at Chicago, one from the Missouri, Kansas & Texas, noted last week, and the other from the Cincinnati, Indianapolis & Western.

Cincinnati reports the purchase there of about $700,000 worth of machine tools for Spain and the Portuguese Government, the American Machinery Syndicate, New York, handling a large part of the transaction.

Chicago dealers report a flourishing business. A Western car builder has bought $150,000 worth of punching and shearing machinery, with the privilege of duplicating the order before May 1. The Oliver Chilled Plow Works, South Bend, Ind., and the Worthington Pump & Machinery Corporation, Cudahy, Wis., are active buyers in Chicago.

Henry Ford & Son, Dearborn, Mich., has purchased considerable equipment at Cleveland for a tractor plant at Hamilton, Ohio. The Eaton Axle Co., a new Cleveland concern, is expected to be in the market shortly for a large lot of tools.

Advances in prices have been put into effect on many lines of machinery since the first of the year. Some of these advances are as much as 10 to 12½ per cent. A few makers have withdrawn quotations.

New York

NEW YORK, Jan. 20.

The General Electric Co., Schenectady, N. Y., is again in the market for machine-tool equipment, having inquiries out for more than 30 tools, and has continued to buy on former lists for its Rochester, N.Y., plant. The Savage Arms Corporation, Utica, N. Y., is inquiring for equipment for the manufacture of ball bearings. The Otis Elevator Co., New York, is making a few purchases to round out equipment bought some weeks ago. Westinghouse, Church, Kerr, Inc., New York, are buying the equipment for extensions of the plant of the American Rolling Mills Co., Middletown, Ohio, and will probably buy some machine tools.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has been placing orders from its purchasing office in the Woolworth Building, New York, on a list of about 250 metalworking and woodworking machines, mostly the latter. Some of the orders were tentatively placed just before the end of last year, but confirmation is now being given.

A crane inquiry of considerable size that may develop shortly is the equipment for the new plant of the American Rolling Mills Co., being constructed at Zanesville, Ohio, by Westinghouse, Church, Kerr, Inc. The Willys Corporation, Elizabeth, N. J., has purchased a 5-ton bucket crane from the Milwaukee Electric Crane & Mfg. Co. and a 10-ton transfer crane from the Niles-Bement-Pond Co. Six cranes remain to be purchased.

Inquiries are in the market from the Vermont Marble Co., Proctor, Vt., for two 25-ton and two 2-ton cranes; from Stone & Webster, New York, for a 20-ton overhead traveling crane, and from the Keystone Steel & Wire Co., Peoria, Ill., for a 3 to 5-ton overhead traveling crane, 40 to 50-ft. span, new or second hand.

The United States High Speed Steel & Tool Corporation, New York, has purchased from the Champion Engineering Co. a 5-ton, 52-ft. span, overhead traveling crane for its Green Island plant, Troy, N. Y., and the Republic Engineers, Inc., has purchased for the Pennsylvania Cement Co., Bath, Me., two 10-ton Champion bucket operating cranes, 90-ft. span. The Chisholm-Moore Mfg. Co. has closed an order from Santa Fé, Argentina, for a 10-ton, double beam hand power crane, 28 ft. 6 in. span. The Shepard Electric Crane & Hoist Co. has sold the following cranes: To the Eastman Kodak Co., Rochester, N. Y., a 4-ton and a 3-ton overhead traveling crane, with 6 ft. 3 in. spans, and a 7½-ton and 10-ton transfer crane, with 26 ft. 7 in. spans; to the Enterprise Mfg. Co., Philadelphia, a 1½-ton overhead traveling crane; to the American Chain Co., East York, Pa., a 10-ton transfer crane, span 80 ft., and a 6-ton overhead traveling crane, span 35 ft.; to the Hazard Mfg. Co., Philadelphia, a 5-ton overhead traveling crane. The Otis Elevator Co. has purchased of the Bedford Foundry & Machine Co., for its Buffalo plant, two 3-ton overhead traveling cranes, spans 40 ft. and 49 ft. 6 in. The J. G. White Engineering Corporation, New York, has purchased a 30-ton overhead traveling crane from the Toledo Bridge & Crane Co. for a contract at Kingston, N. Y. The Phoenix Mfg. Co., Allentown, Pa., has purchased a 30-ton locomotive crane, 65-ft. boom, from the Ohio Locomotive Crane Co.

The Champion Engineering & Supply Co., 21 Park Row, New York, industrial engineer, is in the market for a vertical boring mill up to 14 ft., and a 48-in. x 20-ft. horizontal lathe with a sustaining capacity of 15 tons between centers, either new or second-hand, quotations f.o.b. steamer, New York. The company is also interested in smaller lathes, planers, etc., and will be pleased to receive catalog of such with prices for export f.o.b. New York.

The Steinmetz Motor Car Corporation, with executive and sales offices in the Ziegler Building, 512 Fifth Avenue, New York, recently chartered with a capital stock of $2,000,000, will manufacture a new type light-weight electric delivery truck and an improved electric industrial car for use in manufacturing plants. Both cars are the invention of Dr. Charles P. Steinmetz, chief consulting engineer for the General Electric Co., Schenectady, N. Y. Dr. Steinmetz will act as consulting engineer to the corporation and is a member of its board of directors. The company has acquired a manufacturing plant at Baltimore. The officers of the Steinmetz Motor Car Corporation are: A. Robert Elmore, president; J. P. Story, Jr., vice-president and treasurer; Nelson H. Truett, secretary, and Charles P. Steinmetz. Piper, Carey & Hall, lawyers, Calvert Building, Baltimore, represent the company locally.

Louis Sacks, founder, Wilson Avenue, Newark, N. J., has had plans prepared for three additions, comprising a one-story foundry extension, 40 x 60 ft.; one-story machine shop, 33 x 33 ft., and two-story reinforced-concrete cupola house.

The Duplex Machine Co., 93 Lafayette Street, Newark,

N. J., has filed notice of organization to manufacture automobile and machine parts. Max Schechter, 40 Barclay Street, heads the company.

The J. E. Mergott Co., 316 Jelliff Avenue, Newark, N. J., manufacturer of metal products, will build a two-story addition, 42 x 60 ft., to cost $24,000.

The Precision Instrument Co., Newark, N. J., has leased quarters in the building at Central Avenue and Halsey Street, for a new works.

The Submarine Boat Corporation, Newark, N. J., has completed arrangements with the Emergency Fleet Corporation for a lease of its yards at Newark Bay, now occupied and operated, until Nov. 15, 1923, for a rental of $4,000,000. At the end of this period, the company has the option of purchasing the property for $1,125,000 additional. The yard was established by the Government at a cost said to be about $15,000,000. The agreement provides for the completion of 118 steel fabricated vessels of the 150 contracted for with the company by the Shipping Board, the remaining 32 having been cancelled a short time ago. A total of 88 such vessels, oil-burning type, have so far been finished at the plant.

The plant of the Standard Process Steel Corporation, Phillipsburg, N. J., fronting on the Pennsylvania Railroad, has been acquired by the Judson Tractor Co., which will take possession about Feb. 1, and establish a plant for the manufacture of tractors and parts. It is proposed to provide facilities and equipment for about 400 men.

The General Process Corporation, Bound Brook, N. J., has been incorporated with a capital of $125,000 by Spencer Weart, George O. Smalley and Orrel L. Wrench, to manufacture graphite products.

The Cumberland Glass Mfg. Co., Bridgeton, N. J., is planning the installation of new automatic blowing machines and auxiliary equipment to be used in connection with the present Hartford-Fairmount glass feeders. The company has been merged recently with the Illinois Glass Co., Chicago, and has another plant at Minotola, N. J. Plans are under way, it is said, by the combined organization for the erection of a new plant at Bridgeton.

The Acar Mfg. Corporation, Rutherford, N. J., has been incorporated with a capital stock of $1,000,000 by Alfred L. Moorehead, Rutherford; R. E. Blood, Clifton, N. J., and A. Bachus, Jersey City, to manufacture freight cars and other rolling stock.

The Ordnance Department, Washington, is reported considering plans for a zinc plating plant at the former shell-loading works at Morgan, near South Amboy, N. J., at an estimated cost of about $1,000,000. It would be used for galvanizing boosters used in shells.

The Magneto Parts Mfg. Co., Bloomingdale, N. J., has been incorporated with a capital stock of $100,000 by Isaac G. Gurnee, Eugene G. Gurnee and Charles G. Wilson.

The White Metal Mfg. Co., 1006 Clinton Street, Hoboken, N. J., manufacturer of collapsible tubing, etc., is having plans prepared for a plant to comprise a main six-story building, 135 x 135 ft., and a two-story foundry, 20 x 80 ft. J. C. Schaeffler & Co., 38 West Thirty-second Street, New York, are the engineers.

The Borough Council, Butler, N. J., is considering the installation of a new oil engine at the municipal electric lighting plant. Samuel W. Owen is chairman of the committee.

The Perth Amboy Cornice & Skylight Works, 336-38 Maple Street, Perth Amboy, N. J., has filed notice of organization. Samuel and Joseph Diamond head the company.

The Berwind White Coal Mining Co., foot of Sixth Street, Jersey City, N. J., has filed plans for a 1½-story machine and general workshop to cost about $25,000.

The Domestic Tungsten Lamp Co., 418 Tenth Street, West New York, N. J., has increased its capital stock from $20,000 to $125,000.

The Brunswick Refrigerating Co., New Brunswick, N. J., manufacturer of refrigerating machinery, has had plans drawn for an addition. Improvements will also be made in the present plant.

The American-La France Fire Engine & Automobile Co., Elmira, N. Y., is having plans prepared for its proposed motor-truck manufacturing plant, to be erected on North Arlington Avenue, Bloomfield, N. J. The first building will be one-story, 180 x 200 ft., estimated to cost $300,000 with equipment. Starrett & Van Vleck, 8 West Fortieth Street, New York, are the architects.

The Hudson Block Co., Fanwood, N. J., has been incorporated with a capital stock of $300,000 by William E. Blacklock, Albert R. Palmer, Madison, N. J.; and Edwin T. Wardell, Fanwood, to manufacture tackle blocks and other hoisting equipment.

The Burnrite Coal Briquette Co., 543 New Jersey Railroad Avenue, Newark, N. J., manufacturer of coal briquettes, has acquired about 15 acres fronting on the Raritan River at Perth Amboy, N. J., for a new plant, to be known as plant No. 2. It is proposed to build a five-unit works, with capacity of about 500,000 tons a year. F. M. Crossman is general manager.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, has increased its capital from $1,300,000 to $3,000,000. The company has plans under way for a six-story and three-story addition, 80 x 200 ft., and 50 x 100 ft., respectively.

The Interborough Rapid Transit Co., 165 Broadway, New York, has had plans prepared for a new power plant on Westchester Avenue near St. Peters Avenue, to cost about $50,000.

The Kewanee Boiler Co., New York, has been incorporated with a capital stock of $100,000 by E. E. and B. F. Baker, and H. Adams, 47 West Forty-second Street, to manufacture boilers, radiators, etc.

The Meek Oven Mfg. Co., New York, has been incorporated with a capital stock of $100,000 by S. S. Stern, G. E. Porter and C. A. Voetsch, 60 Broadway.

Knorr Brothers, Brooklyn, operating a cooperage plant at 1112 Wyckoff Avenue, are closing out their business. They are interested in the newly formed Accurate Brass Casting Co., which will occupy their plant. It is planning the erection of a one-story foundry, 80 x 90 ft., on Cooper Avenue, fronting on the Long Island Railroad tracks to cost about $30,000. Brass and other metal castings will be manufactured.

Charles A. Cook & Co., 3911 Second Avenue, Brooklyn, manufacturers of springs, etc., have filed notice of change of name to the Reliance Spring & Mfg. Co.

The Gould-Mersereau Co., 52 West 38th Street, New York, has been incorporated with a capital stock of $225,000 by E. A. Merriam, D. M. Sarkisiam and C. W. Ellis, to manufacture brass and steel products. It operates a plant on Van Alst Avenue, Brooklyn.

The American Hard Rubber Co., 11 Mercer Street, New York, has had plans drawn for a one-story addition, 20 x 42 ft., to its plant at College Point, L. I.

The Perfection Cloth Cutting Machine Co., New York, has been incorporated with a capital stock of $10,000 by J. J Fischer, H. J. Krinsky and S. R. Gerstein, 299 Broadway.

The Turi Iron & Car Co., New Windsor, N. Y., has increased its capital stock from $100,000 to $200,000.

The One Hundred and Sixty-third Street Garage Co., Grand Concourse, New York, has filed plans for a one-story repair works, 100 x 160 ft., to cost $50,000, including equipment. Max Rothbart is president.

The Ludlum Steel Co., Watervliet, N. Y., manufacturer of tool steel, has had plans prepared for a one-story wire mill, 90 x 120 ft., to cost about $40,000.

The Communipaw Steel Co., 95 Liberty Street, New York, with works at the foot of Jersey Avenue, Jersey City, N. J., has filed notice of change of name to the Communipaw Co.

The Sun Metal & Stamping Co., New York, has been incorporated with a capital stock of $25,000 by T. Phillipson and J. and D. Wolfson, 178 St. Mark's Place, Brooklyn, to manufacture metal stampings, etc.

The Petroleum Heat & Power Co., 511 Fifth Avenue, New York, manufacturer of oil burners and equipment, formerly known as the Fess Rotary Oil Burner Co., has plans under way for a one and two-story brick and steel plant, 100 x 200 ft., at Stamford, Conn., to cost $100,000. F. Lathrop Ames is president.

Jakobson & Peterson, Inc., Brooklyn, has been incorporated with a capital stock of $300,000 by D. Jakobson, T. F. and L. F. Peterson, Jr., 1360 East 7th Street, Brooklyn, to operate a shipwright and millwright plant.

The Padua Hold-Up Alarm Corporation, Albany, N. Y., has been incorporated with a capital stock of $100,000 by R. Thwealth, A. J. Parissi and D. J. Dugan, to manufacture electric fire-alarm equipment.

The Ulster Knife Works, Canal Street, Elienville, N. Y., is having plans drawn for an addition.

The W. A. Mills Brass Co., Port Chester, N. Y., has been reorganized with an active capital of $150,000.

George E. Fletcher, Union Turnpike and Queens Boulevard, Newtown, Long Island, N. Y., has completed plans for a one-story automobile service repair shop extension, 100 x 150 ft., to cost $40,000.

The Kayenn Mfg. Co., Brooklyn, has been incorporated with a caital stock of $30,000 by E. Spector, E. R. Greenstein and C. H. Levitt, 51 Chambers Street, New York, to manufacture electrical equipment.

The Talking-Phono Corporation, New York, has been incorporated with a capital stock of $200,000 by T. A. Schick-

ling, A. C. Head and E. M. Cuppinger, 248 Central Avenue, Brooklyn, to manufacture talking machines and parts

The George Haiss Mfg. Co., 141st Street and Rider Avenue, New York, manufacturer of wagon loaders, etc., has had plans prepared for a two-story brick building, 45 x 110 ft., on Canal Place, near 141st Street, to be erected by the Haiss Realty Co., at a cost of about $25,000.

The Neu-Metal Products Corporation, New York, has been incorporated with a capital stock of $100,000 by L. Feldman, H. S. Percy and B. Poringer, 48 East 104th Street.

The McIntyre Iron Co., Albany, has increased its capital stock from $200,000 to $400,000.

The Joseph McGee Iron & Brass Foundry Co., 51 Sixth Street, Long Island City, N. Y., and the Russell Foundry & Machine Works, at the same location, have been merged under the name of the McGee-Russell Founders & Machinists Co., with capital stock of $60,000. J. M. and F. Russell, and M. M. Storm head the company.

The Royal Brass Foundry Mfg. Co., McWhorter Street and New York Avenue, Newark, N. J., has filed notice of organization to manufacture brass, copper and other castings. August C. Fuchs, 304 Oliver Street, and John Musto, 29 Bedford Street, head the company.

The Yank Tank Tractor Corporation, New York, has been incorporated with an active capital of $430,000 by R. F. Scott, J. T. Martin and J. K. Brennan, 155 West Forty-seventh Street, to manufacture motor tractors.

The Domestic Steel & Metal Corporation, New York, has been incorporated with a capital stock of $25,000 by M. Antine, H. L. Ettinger and H. Bloom, 149 Broadway, to manufacture steel and iron products.

The Hoerl Mfg. Co., 676 North Sixth Street, Newark, N. J., has filed notice of organization to manufacture friction clutches. Conrad Hoerl, 443 North Twelfth Street, is president.

The General Alloy Co., 117 Walnut Street, Newark, N. J., has had plans prepared for a new plant at New Jersey Railroad Avenue and Mulberry Place.

The W. & A. Fletcher Co., 1301 Hudson Street, Hoboken, N. J., operating a shipbuilding plant and manufacturing marine engines, boilers, etc., has filed plans for a four-story, brick addition on Thirteenth Street, near Hudson Street, to cost about $25,000.

The Campbell Co., Inc., Rutherford, N. J., has been incorporated with a capital stock of $25,000 by Colin Campbell, Rutherford; William Bell, Lyndhurst; and F. W. Conklin, Mountain View, to manufacture boilers, etc.

The Burwin Co., New York, has been organized to manufacture metal cutting tools. C. G. Johnson and W. H. G. Watson, 41 Park Row, head the company.

The Hedenstrom Mfg. Co., New York, has been incorporated with a capital stock of $100,000 by R. McPherson, L. H. Healy and H. L. Rhodes, 50 Broad Street, to manufacture nautical navigation instruments.

The American Ramming Machine Corporation, Brooklyn, has been incorporated with a capital stock of $100,000 by T. Rock, J. E. Pritchard and M. J. Joyce, 562 Carlton Avenue, to manufacture road-building machinery.

The Atlas Can Co., Brooklyn, has been incorporated with a capital of $50,000 by J. and V. R. Kaufman and W. I. Cohen, 241 Wythe Avenue, to manufacture cans, etc.

The Vanguard Machinery Co., New York, has been incorporated with a capital stock of $50,000 by F. I. Arnold, S. A. and A. Ortlieb, 226 West 113th Street, to manufacture machinery and parts.

Buffalo

BUFFALO, Jan. 19.

The Crosby Co., Buffalo, maker of metal stamping specialties, has contracted for the erection of a brick and steel addition to its plant at Pratt and William streets, to cost $15,000.

The Clipper Tool Co., 38 A Street, Buffalo, has taken out a building permit for a brick and steel factory and pattern building to cost $20,000.

The Medina Stamping & Machine Co., Medina, N. Y., has been incorporated with a capital stock of $15,000 by J. A. Wilson, G. W. Davis and F. D. Newland to manufacture motors and engines.

The J. F. Phister Co., 22 Metcalf Street, Buffalo, has had plans drawn for a three-story addition, 50 x 150 ft., to be erected at Metcalf and Clinton streets at a cost of $35,000.

The Barcalo Mfg. Co., 225 Louisiana Street, Buffalo, manufacturer of brass and metal beds, has increased its capital stock from $300,000 to $1,000,000.

The Curtiss Aeroplane & Motor Corporation, Churchill Street, Buffalo, has received an order from the Government aggregating $2,500,000. It includes 200 land machines and 247 machines of training type (J. D. N.).

Plans for a two-story repair shop, 60 x 138 ft., to cost $35,000, have been completed by the Jacob Dold Packing Co., 745 William Street, Buffalo.

The American Car & Foundry Co., Babcock Street, Buffalo, has awarded a contract to the J. W. Cowper Co., Fidelity Building, for plant extensions to cost $500,000.

The Fowler Nail Co., Seymour, Conn., is arranging for the early removal of its local plant to Buffalo, where a factory is now being completed. The main building will be about 400 ft. long, and the entire works will provide approximately 80,000 sq. ft. of manufacturing space.

The Vacuum Products Mfg. Co. of America, Erie, Pa., has been incorporated with a capital stock of $300,000 by Harry L. Short, F. B. Cobham and William Lyons.

The Kanawha-Elk Horn Collieries, Inc., Buffalo, has been organized with a capital of $1,000,000 by the merger of the Corson By-Products Co., the Buffalo Kanawha Coal Corporation and the Cumberland Elk Horn Co., all of Buffalo. The new company has properties in West Virginia and the Elk Horn district of Kentucky. It is proposed to install machinery and equipment at the various sites to provide for a daily output of close to 2000 tons. Maurice E. Preisch, Buffalo, and George J. Brendel, Hamburg, N. Y., head the new organization.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., has awarded a contract to the Ferro Concrete Construction Co., Cincinnati, for a five-story and basement factory addition, 300 x 400 ft., to cost about $700,000, including equipment.

The Thatcher Process Co., Syracuse, N. Y., has been incorporated with an active capital of $100,000 by E. L. Robertson, B. I. Cooper and J. D. Grant, to manufacture electrical and chemical apparatus.

The Gordon Metal Bed Corporation, Syracuse, N. Y., has been incorporated with a capital stock of $50,000 by I. J. Bigbee, S. Lowenstein and R. Gordon.

The McIntosh-Seymour Corporation, Auburn, N. Y., manufacturer of engines, etc., will build a two-story addition, 40 x 110 ft.

The Board of Supervisors, Binghamton, N. Y., is considering the erection of a new electric light and power plant at the County Farm.

The Champion Wagon Co., Oswego, N. Y., has been reorganized with an active capital of $140,000.

The Maxwell Steel Vault Co., Oneida, N. Y., manufacturer of steel burial vaults, has increased its capital stock preparatory to extending its manufacturing operations and for the purpose of acquiring additional property, for the construction of new buildings, and the purchase of machinery and equipment, including power presses, dies, transmission and some electrical apparatus.

Ward Brothers, Lockport, N. Y., are having plans prepared for a machine shop to cost about $25,000. Miller & McNeil, Lawyers' Exchange Building, Buffalo, are the architects.

The Lineatine Mfg. Co., 624 St. Paul Street, Rochester, N. Y., manufacturer of typewriter copy holders and other metal specialties, has increased its capital stock from $50,000 to $150,000.

The Niagara Sprayer Co., Middleport, N. Y., has increased its capital stock from $500,000 to $3,000,000 and is erecting a new chemical plant, foundry and sulphur refinery and is still negotiating for part of the machinery. Theodore Dosch is general manager.

The Jacob Dold Packing Co., Buffalo, has taken out a building permit for erection of a two-story, concrete car repair shop at Detroit Street and the New York Central Railroad, to cost $35,000.

The National Fire Escape Corporation, Rochester, recently incorporated with a capitalization of $250,000, will erect an assembling plant to cost $150,000.

The Pohlman Foundry Co., Buffalo, will erect an extensive addition to its foundry plant at Baltz Avenue and the Erie Railroad.

The Buffalo Hardware & Foundry Co., Buffalo, has taken out building permit for a brick and steel foundry addition, at Hertel Avenue and the Erie Railroad, to cost $18,000.

The organization of the Atmospheric Nitrogen Co., Syracuse, capitalized at $5,000,000, has been perfected by the Solvay Process Co., Syracuse, E. L. Pierce, president, and by the General Chemical Co., and is planning to erect a plant to cost $1,000,000.

Articles of incorporation have been filed by Gere & Willis, Syracuse, to manufacture automobile supplies. H. M. Gere, W. W. Willis and O. W. Hoff are directors. The capital stock is $30,000.

New England

BOSTON, Jan. 19.

Lockwood, Greene & Co., Boston, are drawing plans for another foundry to be erected by the Saco Lowell Works at Newton Upper Falls.

Plans have been completed for the erection of a drop forging plant by the Storms Drop Forging Co., Springfield, Mass.

Engineers have been selected for the $250,000 addition to the plant of Billings & Spencer Co., Hartford, Conn.

The I. G. Cannon & Sons Machine Co., 37 Spring Street, Lynn, Mass., is adding to its plant to provide space for the manufacture of automobile parts. The new quarters will be ready for occupancy before spring.

Contractors are figuring on a one-story, 100 x 300 ft. factory for the Owens Equipment & Mfg. Co., New Haven, Conn.

Contractors are figuring on a four or five-story addition, 52 x 187 ft., to the factory of the Hart & Hegeman Co., Hartford, Conn., electric wiring devices, etc.

The Torrington Building Co., Torrington, has been awarded the contract to build a factory for the American Pin Co., at Waterbury, Conn.

Contract has been awarded for the construction of a small one-story factory for the Metropolitan Body Co., Bridgeport, Conn., which is operated by Carlson Brothers.

Engineers will soon take bids for the construction of a wire mill to be built at Bridgeport, Conn., for the Bridgeport Screw Co.

The Smedley Co., New Haven, will erect a three-story factory on Brewery Street, having 12,000 sq. ft. of floor space, which will be occupied by four manufacturing concerns. Three companies have already obtained rentals.

The building occupied by the Standard Saw, Tool & Machine Co., South Boston, Mass., was badly damaged by fire recently.

The William H. Haskell Machine Co., Pawtucket, R. I., has awarded a contract to the Fred T. Ley Co., Springfield, Mass., for the erection of an addition to its plant on Main Street, 81 x 123 ft.

The Connecticut Tubing Co., Hartford, Conn., has been incorporated with a capital stock of $100,000 by W. B. Lashar, Bridgeport, Conn., head of the American Chain Co.; B. I. Ashmun, Bridgeport, and E. L. King, 17 Elizabeth Street, Hartford, to manufacture metal tubes and tubing.

Landers, Frary & Clark, New Britain, Conn., manufacturer of electrical heating and cooking appliances, hardware, etc., has increased its capital stock from $5,000,000 to $6,000,000.

The Premier Potter Printing Press Co., Canal Street and Central Avenue, Shelton, Conn., maunfacturer of printing presses, has had plans prepared for a four-story reinforced concrete addition, 40 x 75 ft., to cost about $60,000.

The E. V. B. Mfg. Co., New Haven, Conn., has been incorporated with a capital of $100,000 by W. A. Evans, M. E. Voigt and William Bryan, 185 Dwight Street, to manufacture automobile hardware.

The Springfield Automatic Screw Machine Co., Springfield, Mass., has been incorporated in Delaware with capital of $3,500,000 by Charles R. Van Norman, Springfield; Clarence J. Wetzel, Chicopee, Mass.; and M. Douglas Williams, Boston, to manufacture machine tools.

The Automatic Polishing Machine Co., Inc., New Haven, Conn., has filed notice of dissolution.

The Scovill Mfg. Co., Waterbury, Conn., manufacturer of brass and metal goods, has commenced the razing of a number of buildings on East Main Street, clearing the site for its proposed four-story, concrete and brick addition.

The Imperial Knife Co., Providence, R. I., has plans under way for the erection of a two-story and basement addition, 100 x 200 ft., at Braton Avenue and Center Street.

The Hartford Battery Mfg. Co., Hartford, Conn., manufacturer of electric batteries, has increased its capital from $250,000 to $350,000.

The plant and business of the A. H. Steele Co., Worcester, Mass., manufacturer of drop forgings, has been sold by the owner, Albert H. Steele, to F. T. Rogers, Jr., treasurer and general manager A. Hankey & Co., Rochdale, Mass., a suburb of Worcester, manufacturers of machine knives and drop forgings. The Steele company specializes in light forgings and occupies buildings erected at Lakeview two years ago on a 9-acre site. While Mr. Rogers will conduct the Steele plant as his own venture it will constitute practically an extension of the Hankey drop forging department. He will continue his management of the Rochdale business in connection with that of the Steele plant. The A. H. Steele Co. will be reincorporated, probably under the name of the Rogers Drop Forge Co.

The Standard Screw Co. has definitely abandoned its works at Worcester, operated as the Worcester Machine Screw Division. The screw machinery was removed to its other factories some months ago, and the plan was to use the structures at Worcester as machine shops, as the Standard company builds a large part of its equipment. The decision has now been reached to dispose of the Worcester Machine Screw Co. buildings, and they are offered for sale.

The J. N. Lapointe Co. of Massachusetts, Hudson, Mass., manufacturer of machine tools, has given up building the Whitcomb type of planers and is carrying on negotiations for the sale of the factory devoted to this line. Reports that the plant has been sold are incorrect.

The newly organized Century Co., capitalized for $600,000, manufacturer of mechanical dishwashers, has let contracts for the construction of two buildings in Holyoke, Mass.

Philadelphia

PHILADELPHIA, Jan. 19.

Winfield S. Barnes & Co., Twentieth Street and Erie Avenue, Philadelphia, fabricators of structural iron and steel, are having plans prepared for a four-story addition, 100 x 300 ft., to cost $200,000.

The Bessemer Motor Truck Co., Grove City, Pa., manufacturer of motor trucks, is taking bids for plant additions at Holmesburg Junction, Philadelphia, comprising a one-story building, 100 x 100 ft., and a two-story building, 40 x 100 ft. It also plans to complete a structure already partially erected, 100 x 400 ft.

The T. S. Johnson Sons Co., 622 Cherry Street, Philadelphia, operating a sheet-metal working works, has awarded a contract to F. L. Hoover & Sons, 1023 Cherry Street, for a two-story and basement addition, 32 x 50 ft., to cost $15,000.

The S. R. Blockson Motor Co., 661 North Broad Street, Philadelphia, has accquired 671-673 North Broad Street, extending to Ridge Avenue, 40 x 140 ft., for a service works. The building is now occupied under lease by the Electric Storage Battery Co.

The Allentown Cable & Machine Co., Allentown, Pa., recently organized, has acquired the Eberts Building, 160 x 220 ft., at Hamilton Street and the Lehigh Valley Railroad, for its new plant.

With the completion of its new shops and engine terminal at Ashmore, Pa., the Lehigh Valley Railroad is planning to remove part of its shop equipment at Hazleton to this location, vacating some buildings which will be used by the Hazleton Drop Forge Co., formerly the Harleigh Iron Works, for extensions to its plant.

The Monitor Bi-Loop Radiator Co., Lancaster, Pa., has completed plans for a one-story building, 50 x 110 ft., on the Harrisburg Pike, estimated to cost $15,000.

The Rath Signal Lamp Co., Altoona, Pa., has been incorporated with a capital stock of $100,000 by F. H. Feltwell and associates.

The fire loss sustained by the Harrisburg Pattern & Model Works, Harrisburg, Pa., Jan. 8, is estimated at about $50,000. It is understood that the works will be rebuilt.

The Traylor Engineering & Mfg. Co., Allentown, Pa., manufacturer of metallurgical and crushing machinery, marine engines, boilers, etc., has arranged for a preferred stock issue of $500,000, to provide additional working capital in connection with the construction of tractors and trucks at its former shipbuilding plant at Cornwells. Samuel W. Traylor is chairman of the board.

The Dodge Steel Co., Morris Building, Philadelphia, has acquired two tracts of land, comprising the corner of Tacony Road and Hellerman Street, 395 x 492 ft., and adjoining property at State and Magee streets.

The Department of Public Works, Philadelphia, has completed plans for a new engine plant and pumping station at its Lardners Street waterworks plant.

The Motor Parts Co., 847 North Broad Street, Philadelphia, has leased quarters in the building now being erected at Fifteenth and Mount Vernon streets, for a new works.

August Hoffman, Philadelphia, is having plans prepared by LeRoy B. Rothschild, 1225 Sansom Street, for a six-story automobile service and repair building, 58 x 125 ft., at 1603-7 Vine Street.

The Philadelphia Spring Works, 1439 Hutchinson Street, Philadelphia, has been incorporated with a capital stock of $200,000 to manufacture springs, etc.

The Sheldon Axle & Spring Co., Wilkes-Barre, Pa., is considering plans for an addition on Conyngham Avenue.

William H. Baker, Trenton, N. J., operating a machine

works at the foot of Perrine Avenue, has completed plans for a one-story machine shop on Norway Avenue.

The Star Porcelain Co., Muirhead Avenue, Trenton, N. J., manufacturer of electrical porcelain specialties, is planning a two-story addition, 34 x 68 ft.

The Union Rubber & Asbestos Co., Trenton, N. J., has been incorporated with a capital stock of $50,000 by Daniel M. Lovett, Harry M. Brill and J. M. Shear.

The General Tractors, Inc., Paulsboro, N. J., desires to get in touch with concerns prepared to machine tractor parts in quantities. They are also in the market for materials and supplies used in connection with the manufacture of tractors. J. B. Farwell should be addressed.

The Lansdale Foundry Co., Lansdale, Pa., has let contract for an addition to its foundry, 50 x 200 ft., which will increase its capacity from 15 to 25 tons per day. It expects to install additional molding machine equipment, and is now specializing on medium weight castings.

The Pennsylvania Tool & Mfg. Co., York, Pa., capitalized at $10,000, has been chartered to manufacture tools, jigs, fixtures, etc. Joseph M. Lehmayer is treasurer.

The Keystone Die Casting Co., Norristown, Pa., has been chartered with a capital stock of $200,000 by Victor Mauk, Norristown, and Herbert S. Mauk and Frank Sutcliffe, Consohocken. Earl J. W. Ragsdale, Norristown, is treasurer.

The Sterling Body Corporation, Philadelphia, has been organized by Harold B. Larselere, Wyncote, Pa.; Samuel E. Baily, North Wales, Pa., and George J. Edwards, Jr., 4924 Cedar Avenue, Philadelphia, to manufacture bodies for motor vehicles. The capital stock is $50,000.

The Ideal Electric Mfg. Co., Philadelphia, capitalized at $20,000, has been chartered to manufacture electrical and mechanical equipment. Jacob Pearl, 160 Walnut Street, Philadelphia, is treasurer.

The Keystone Screw Co., Seventeenth and Lehigh streets, Philadelphia, has been authorized to increase its capital stock from $100,000 to $165,000. A. F. Hagar, Philadelphia, is assistant treasurer.

Baltimore

BALTIMORE, Jan. 19.

Ottenheimer Brothers, 413 North Howard Street, Baltimore, manufacturers of refrigerators, etc., have awarded a contract to H. Calvin Barnes for a plant addition, one story.

B. Ulsch and B. Lari will establish an automobile repair shop in the rear of 1840 Gough Street, Baltimore.

The Service Auto Spring Co., 2360 Eutaw Place, Baltimore, has been incorporated with $50,000 capital stock to manufacture automobile springs, etc. The incorporators are Joseph C. and Sol H. Abrams and Alexander L. Brash.

The Chesapeake Fire Brick Co., Elkton, Md., has been incorporated with $20,000 capital stock by George S. Hoell, Herbert L. Maris and Bert B. Davis to manufacture fire brick, pottery, etc.

In connection with the organization of the Champion Motors Corporation, Baltimore, it has been announced that its plant will probably be ready for operation within two or three months.

The J. M. Decker Co., Inc., 118 Sharp Street, Baltimore, manufacturer of bakers' utensils, is understood to be planning to build an additional plant.

The Norfolk Construction & Marine Repair Corporation, Norfolk, Va., has been chartered with $1,000,000 capital stock. M. A. Butler is president and R. M. Stribling secretary.

The Baltimore Buggy Top Co., 107-113 West Mount Royal Avenue, Baltimore, is reported to have purchased property at Guilford Avenue and Chase Street, upon which it will erect an automobile garage and repair shop.

The Ajax Rubber Co., 25 West Mount Royal Avenue, Baltimore, has acquired about 90 acres at Sandusky, Ohio, as site for a new tire plant. It operates plants at Trenton, N. J., and Racine, Wis., and proposes to make the third, or Sandusky works, the largest plant. It will be erected on the unit plan and will cost about $1,000,000, including equipment. The first unit is expected to be ready for operation in the fall, and will give employment to over 1000 persons. A housing development, totaling about 400 homes for employees at the works, is also being arranged. Horace DeLisser is president.

The Coastwise Shipbuilding Co., foot of Andre Street, Baltimore, is considering the construction of a drydock with machine and construction shops at its property near Latrobe Park.

Reus Brothers, Baltimore, operating a machine works at 146 West Mount Royal Avenue, have awarded a contract to the Consolidated Engineering Co., Calvert Building, for a one-story foundry extension to cost $25,000.

Plans for a sulphuric acid plant to cost about $1,000,000, with machinery and equipment, have been perfected by the Union Acid Works, Baltimore, recently organized by George A. Whiting, president Standard Wholesale Phosphate Co., Curtis Bay, Baltimore, and associates. Property has been acquired on the water front. The plant will be built in two units, each about 150 x 600 ft., of steel and concrete, and with capacity of about 200 tons per day. A large part of the equipment will be automatic in operation to allow a minimum working force.

The Armour Fertilizer Works, Munsey Building, Baltimore, with headquarters at Chicago, has commissioned Westinghouse, Church, Kerr, Inc., 37 Wall Street, New York, to prepare plans for its proposed plant in the Curtis Bay section. Property totaling about 20 acres has been acquired, and the plant with equipment is estimated to cost close to $1,000,000.

The Wilmington Automobile Co., 221 West Tenth Street, Wilmington, Del., has had plans prepared for a four-story service building at Tenth and Tatnall streets, to cost $50,000.

The Cooper shipyards at Oxford and Sharptown, Md., have been acquired from S. J. Cooper by C. H. Conley, for many years manager at the last noted yard. The new owner will operate the plants, and plans the installation of additional equipment.

The duPont Motor Mfg. Co., Wilmington, Del., has filed notice of change of name to the duPont Motors, Inc., with capital increase from $2,000,000 to $4,800,000.

The Bethlehem Loading Co., New Castle, Del., a subsidiary of the Bethlehem Steel Co., is arranging for the sale of its local properties, comprising about 124 acres of land, with frontage on the Delaware River. The works consist of a number of one-story buildings, aggregating 136,700 sq. ft., with power plant.

The equipment installation at the proposed four-story plant of the Wizard Automobile Co., 4 North Brevard Street, Charlotte, N. C., recently incorporated with a capital stock of $1,000,000, will comprise machine tools, such as lathes, drill presses, drop hammers; foundry equipment; forge and blacksmith shop equipment, and tools for handling small work. The structure will be 200 x 600 ft., and will cost about $200,000. F. W. Edwardy is president, secretary and treasurer. T. A. MacEwan is the architect and engineer.

The Crowell Automobile Co., Danville, Va., will build a three-story service and repair works to cost $125,000.

The Lynchburg Foundry Co., Lynchburg, Va., has awarded a contract to the Virginia Bridge & Iron Co., Roanoke, for an addition, 120 x 230 ft., to be equipped as a pipe shop and foundry, at an estimated cost of $200,000.

The Farmers' Co-operative Phosphate & Fertilizer Co., Mulberry, Fla., recently organized, is planning for a fertilizer plant to cost over $500,000. L. N. Pipkin, Mulberry, is president; C. M. Clayton and George B. Morgan, Lakeland, Fla., are vice-presidents.

J. C. Hardin & Co., Rock Hill, S. C., will erect a building for the manufacture of automobile tops, truck bodies, etc.

The Bruce Drydock Co., Pensacola, Fla., will spend about $200,000 to establish a repair plant and to install a machine shop, a boiler shop, etc. About $55,000 will be spent for machinery.

The Greenville, S. C., Iron Works, Inc., founder and machinist, organized six years ago and occupying leased buildings and machinery, has purchased its own property immediately adjoining the present works, and construction has begun on its new foundry and machine shop. When completed, the company will have 15,600 sq. ft. of molding floors and approximately 10,000 sq. ft. of machine-shop floor. New machinery will be installed in the machine shop, including lathes, drill presses, molding machines and a boring mill, and the entire foundry equipment will be new. The company is under the management of W. Lindsay Wilson, who is also the controlling factor in the Wilson Co., a mill supply organization. The actual cash outlay of the proposed investment will amount to about $125,000.

Indianapolis

INDIANAPOLIS, Jan. 19.

The Automotive Parts Co., 1105 Bates Street, Indianapolis, is taking bids for the construction of a one-story plant, 100x200 ft., on Massachusetts Avenue. Lawrence G. Cummins is manager.

The Mulholland Machine Co., West Twenty-third Street and the Belt Railroad, Indianapolis, has commenced the erection of two new units at its plant, to comprise a general metal working plant and machine shop respectively. W. K. Mulholland is president and general manager.

S. E. Shacht, 1700 Prairie Avenue, Elkhart, Ind., has had plans prepared for the erection of a one-story foundry, 96x110 ft., at Goshen, Ind., to cost about $15,000.

The Hercules Gas Engine Co., Evansville, Ind., has increased its capital stock from $250,000 to $500,000.

The Crum-Wiley plant, Peru, Ind., manufacturer metal products and automobile parts, which has been in receiver's hands, has been sold to John T. Knott, Fort Wayne, Ind.

The Indianapolis Stove Co., Indianapolis, is having plans prepared for an addition to its foundry.

The Haywood Foundry Co., organized by the Haywood Tire & Equipment Co., Indianapolis, is planning the erection of a foundry for the manufacture of iron castings.

The Lafayette Motors Co. is having plans drawn for a one-story manufacturing building, 100x1000 ft., at Mars Hill, a suburb of Indianapolis.

The E. C. Mfg. Co., Elkhart, Ind., has been incorporated with $50,000 capital stock to manufacture spark plugs. The directors are Peter C. Kendall, Max Solomon and Gustave O. Johnson.

The Goodland Mfg. Co., Goodland, Ind., has been incorporated with $250,000 capital stock, to manufacture electrical supplies. The directors are Lawrence Romine, Dale A. Rowe and E. E. Kertis.

The Hammond Malleable Iron Co. has been incorporated at Hammond, Ind., with $10,000 capital stock to manufacture iron products. The directors are Henry J. and Harry C. Wanner and Barton J. Steelman.

The Brazil Motors Co.'s factory, Brazil, Ind., has been sold to C. C. Rhetts of Brazil, who will convert it into a furniture factory.

The Evansville Metal Bed Co., Evansville, Ind., is building an addition to its plant, 120x120 ft.

The Warriner Mfg. Co., Fort Wayne, Ind., has increased its capital stock from $10,000 to $50,000.

The American Governor & Mfg. Co., Ltd., Anderson, Ind., has been incorporated with $35,000 capital stock to manufacture automotive accessories. The directors are Charles Cookman, Guy Robinson and W. R. Bagot.

The Griffith Foundry Co., Griffith, Ind., has been incorporated with $50,000 capital stock to make iron castings. The directors are Harry C. Stuart, C. F. Holt and S. E. Stuart.

Pittsburgh

PITTSBURGH, Jan. 19.

The American Nut & Bolt Fastener Co., 3 Ontario Street, Pittsburgh, has had plans prepared for a one-story steel and brick addition, 48 x 100 ft. Edward G. Lang is president.

The Wienmann Pump & Supply Co., Pittsburgh, has acquired the four-story brick building, 20 x 80 ft., at 210 Second Avenue, for a new local works.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has closed a contract with the Merchant Shipbuilding Co., Chester, Pa., for propelling machinery for two 10,000-ton capacity vessels now in course of construction at the yard for the Shawmont Steamship Co.

The Torrance Piston Ring Co., Butler, Pa., has been incorporated with a capital of $20,000 by R. T. Torrance and associates, to manufacture piston rings for automobile engines.

The Titusville Forge Co., Titusville, Pa., which recently acquired the local plant of the Bethlehem Steel Co., has arranged for a note issue of $1,150,000. It will use the plant for the manufacture of hammered and pressed gas and steam engine crankshafts, and other forgings.

The Pennsylvania Casting & Machine Co., Keystone Building, Pittsburgh, is considering the erection of a two-story and basement building, 29 x 39 ft., on Preble Avenue.

The Iron City Sand Co., Pittsburgh, has leased property at the Point, on the Monongahela River, near the works of the Marine Mfg. & Supply Co., and will establish a local receiving and distributing plant. Hoisting and unloading equipment and other mechanical apparatus will be installed.

The Mine Safety Appliances Co., Pittsburgh, has commenced the erection of a one-story machine and chemical building, 90 x 200 ft., on property recently acquired at Thomas Boulevard and Braddock Avenue, aggregating 203 x 291 ft. Other buildings will also be erected, with total cost estimated at $85,000.

The Autocar Sales & Service Co., Pittsburgh, has acquired property at Baum Boulevard and Liberty Avenue for a one-story service and repair works to cost about $150,000, including equipment.

The Whitaker-Glessner Co. interest to operate the former plant of the Wheeling Ceiling & Roofing Co., Warwood, W. Va., will be known as the Ackerman Mfg. Co. It was recently organized with a capital of $300,000. The property acquired totals about 4 acres and will be used for the manufacture of iron, steel and sheet-metal products, as well as machinery and parts. It is planned to install the necessary additional machinery as soon as possible to insure early operation. The plant will give employment to about 200 men for initial operations. W. E. Ackerman, president, was formerly connected with the Wheeling Ceiling & Roofing Co., and later with the Whitaker-Glessner Co. at its Portsmouth, Ohio, plant. Others interested are George W. Hocking, secretary Whitaker-Glessner Co.; William B. Greer, purchasing agent for that company; J. Frank Bycott and T. H. Jones, president and vice-president respectively the W. H. Chapman & Sons Co.

The Greer Steel Co., Morgantown, W. Va., has been incorporated with a capital stock of $500,000 by H. C. Greer, A. W. Hawley and Everhart Bierer, to manufacture iron and steel products.

The Gilmore Mfg. Co., Charleston, W. Va., has been incorporated with a capital stock of $50,000 by B. Stanley Gill, George W. McClintic and John R. Wayes, to manufacture automobile bodies.

The Sistersville Tank & Boiler Works, Sistersville, W. Va., is taking bids for a one-story addition, 95 x 150 ft.

The Burrel Technical Supply Co., Pittsburgh, capitalized at $50,000, has been incorporated to manufacture scientific instruments. George H. Deike, Chamber of Commerce Building, Pittsburgh, is treasurer.

The Engineering Specialties Co., Pittsburgh, has been incorporated with a capital stock of $5,000 by Charles W. Frankel, 4139 Murray Street, and others, to manufacture electrical machinery.

The Bellwood Steam Shovel Co., Bellwood, Pa., has been chartered with a capital stock of $75,000 by F. D. Miller, John J. Irvin and H. E. Grant to manufacture steam shovels, boilers, etc.

The Fahnestock Mfg. Co., Avonmore, Pa., maker of acid open-hearth steel castings, is asking for bids on an extension to its main steel foundry building, to be 130 x 140 ft., complete with crane runways, in three spans. Contracts have been let for additional air compressors and pneumatic equipment. Plans include an additional open-hearth furnace, molding machine and other equipment which will double the steel casting output.

The Allegheny Gear Works, Inc., Chateau and Page streets, Pittsburgh, manufacturer of gears, sprockets, shafts, bushings, machine parts, etc., has increased its capital stock in order to provide additional equipment and to supply working capital. W. H. Thompson is general manager.

Cleveland

CLEVELAND, Jan. 19.

The aggregate volume of business and orders for single tools and small lots continues heavy for all types of standard machines. Automobile manufacturers in this and the Detroit section are still adding to their equipment, much of their demands being for special machines. Henry Ford & Son are understood to have purchased in the past 10 days considerable equipment for their Hamilton, Ohio, tractor plant and are now negotiating for 26 screw machines. The Eaton Axle Co., recently organized in Cleveland, is expected to be in the market shortly for a large lot of machine tools for making automobile axles.

The demand for screw machines shows a marked gain over December and is very active. Orders placed with a local manufacturer the past few days include 18 screw machines for the Eclipse Machine Co., Elmira, N. Y.; 9 for the Toledo Steel Products Co., 5 for the Domestic Engineering Co., Dayton; 6 for the General Aluminum & Brass Mfg. Co., Detroit, and 4 for Thiery & Kendrick, Detroit. The Pennsylvania Railroad has purchased a turret lathe and 2 screw machines for its shops at Stark, Ohio. The Browning Co., Cleveland, has been buying some machinery recently and has just purchased a 6-in. boring mill.

Owing to the increased cost of production, due largely to higher prices of castings and other raw material, many builders of machine tools advanced prices the past week and it is expected that others will follow before Feb. 1. Among the advances are 10 per cent on some makes of precision lathes, radial and vertical single spindle drilling machines and by at least one manufacturer on horizontal boring mills.

Some of the heavy foundries in this district are in a position to take on more work but the light shops engaged largely in automobile work are crowded to capacity.

The Van Dorn Iron Works Co., Cleveland, will shortly begin additions to its plant involving an expenditure of approximately $500,000. They will include two and three-story buildings, 120x250 ft., for increasing the capacity of its metal furniture department, and the other, 100x300 ft. for miscellaneous iron work.

The W. W. Sly Mfg. Co., Cleveland, has placed contract with the A. A. Lane Construction Co. for an extension 115x220 ft. Part of this will be a two-stories to be used as a machine shop and the remainder a one-story erecting shop.

The Automatic Rim Co., Hippodrome Building, Cleveland, has acquired a site on West 116th Street near Madison Avenue, and contemplates erecting a plant for the manufacture of automobile rims. W. J. Burns is president; J. B. Harris vice-president and general manager, and James Ambrose, secretary and treasurer.

The Lake Erie Foundry Co., Painesville, Ohio, recently incorporated, in which a number of Cleveland men are interested, will establish a gray iron foundry and specialize in automobile and truck castings. L. H. DeForest, formerly associated with the Aluminum Castings Co., will be manager.

The Lucius Reinforced Tank Co., Massillon, Ohio, has increased its capital stock from $100,000 to $500,000 and will erect a new plant, 100x300 ft.

The B. F. Goodrich Rubber Co., Akron, Ohio, will erect an eight-story mill type building, 300x1766 ft. to be used for warehouse purposes.

The Atlantic Foundry Co., Akron, Ohio, has had plans completed for a new gray iron foundry, 105x160 ft., to be erected in Cuyahoga Falls, Ohio.

The Toledo Tap & Die Co., Toledo, Ohio, has increased its capital stock from $95,000 to $125,000 and will install additional equipment with a view of doubling its capacity.

The Garford Motor Truck Co., Lima, Ohio, is planning the erection of a two-story factory, 100x400 ft., for assembling purposes.

The Rath Foundry & Machine Co., Sebring, Ohio, has been incorporated with a capital stock of $50,000 by Charles J. Rath and others, and will equip a foundry.

The Halladay Motor Corporation, now located in Attica, Ohio, will move to Newark, Ohio, and contemplates the erection of a plant, 60x800 ft., for the manufacture of automobiles.

The Dover Mfg. Co., Dover, Ohio, is making some extensions to its foundry, including the erection of a charging building and a 12-ton cupola.

The Cardinal Phonograph Co., Newark, Ohio, will build a new plant.

The National Copper & Smelting Co., now operating a plant in Detroit, will establish works in Cleveland for the manufacture of small seamless brass and copper tubing. It has acquired a building, 75 x 246 ft., at Euclid Avenue and Coltman Road, formerly used by the Cleveland Railway Co., and expects to begin operations in about 60 days. Alexander McGregor will be in charge of both the Cleveland and Detroit plants.

The Draper Mfg. Co., Cleveland, maker of manufacturers' steel barrels, has purchased a 12-acre site near East Ninety-second Street, Union Avenue and the Belt Line Railway, and will at once begin the erection of the first unit of a new plant.

The American Forge & Machine Co., Canton, Ohio, will enlarge its plant by the erection of a new building, 65 x 260 ft., and install 16 additional hammers. It recently increased its capital stock from $150,000 to $2,000,000, of which only $300,000 will be disposed of at the present time.

The Timken Roller Bearing Co., Canton, Ohio, will erect two buildings, one 110 x 420 ft., to be used in connection with its tube mill department and another 71 x 220 ft. for a pickling plant.

The Sunlight Electric Co., Warren, Ohio, will enlarge its plant by the erection of an addition, 40 x 150 ft.

The Heltzel Steel Form Co., Warren, Ohio, will build an extension to its plant, doubling its present capacity, and install a 10-ton electric crane. Contract for the building has been placed with the Structural Steel Co., Newton Falls, Ohio.

The Toledo Machine & Tool Co., Toledo, Ohio, plans the erection of a one-story pattern shop, 58 x 168 ft.

The Toledo Cyclomobile Mfg. Co., Toledo, Ohio, will erect a one-story building with 35,000 sq. ft. of floor space, for the manufacture of one-passenger automobiles. The company has a capital stock of $100,000. Charles Hamel is president and W. E. Himmelhoch is secretary.

The Wise-McClung Mfg. Co., New Philadelphia, Ohio, maker of vacuum cleaners, will make several extensions to its plant, including a two-story and basement building for assembling and storage, machine shop, power plant, addition to its motor and assembling building, polishing department, and extension to its foundry. The company will increase its capital stock to $1,000,000. W. J. Wise is president and W. E. McClung secretary and treasurer.

H. E. Beck has resigned as manager of the Dennison Foundry & Machine Co., Dennison, Ohio, and with William Gallagher will organize a company to erect a foundry and machine shop at Uhrichsville, Ohio.

The Federal Radiator Co., Zanesville, Ohio, has had plans prepared for the erection of a one-story plant, 226 x 700 ft.

Chicago

CHICAGO, Jan. 19.

Several tool manufacturers have raised prices and others have withdrawn quotations preparatory to announcing advances. A line of planing machines has gone up 12½ per cent, and a thread milling machine and horizontal boring mill have advanced 15 per cent each. A prominent maker of vertical boring mills has canceled existing quotations, and similar action has been taken by a Western manufacturer of upright drilling machines. Two second class engine lathes have gone up 10 per cent.

In the face of current price advances and increasingly unsatisfactory deliveries business continues to flourish. A Western car builder has bought $125,000 worth of punching and shearing machinery with the privilege of duplicating the order before May 1. The Oliver Chilled Plow Works bought equipment for a new forge shop at South Bend, Ind., its purchases including two heavy upright drills and two milling machines. The Folk Co., Milwaukee, has purchased three turret lathes. A number of heavy engine lathes have been bought by manufacturers of oil well drilling machinery in the Southwest. Washing machine manufacturers have been buying rather freely of late. An Iowa novelty manufacturer recently ordered six power presses for light work.

Two railroad lists are before the trade, one issued by the Missouri, Kansas & Texas Railroad, briefly noted in this column a week ago, and a short list issued by the Cincinnati, Indianapolis & Western. The majority of the tools asked for by the M., K. & T. are motor driven and include the following:

Three 16-in. engine lathes.
One 18-in. engine lathe.
One 22-in. engine lathe.
One 24-in. engine lathe.
One 26-in. engine lathe.
One 30-in. engine lathe.
One 42-in. engine lathe.
Two 42-in. coach wheel lathes.
Two 80-in. driving wheel lathes.
One 30-in. shaper.
Three 32-in. shapers.
Three 36-in. upright drilling machines.
Two 42-in. upright drilling machines.
One 50-in. half universal radial drill.
One 5-ft. half universal radial drill.
One 42-in. vertical boring mill.
One 84-in. vertical boring mill.
One 32 in. x 32-in. x 10-ft. planer.
One 1-in. triple head bolt cutter.
One bolt lathe.
One horizontal punching and shearing machine.
One horizontal boring and drilling machine.
One 6-in. pipe machine.
One set of plate bending rolls, ⅝ in. by 10 ft.
One set of plate bending rolls, 1¼ in. by 12 ft.
Two large single end punches, 48-in. and 54-in. throats.
One 1½-in. bolt heading machine.
One bar shear, 1½ in. capacity.
One punch and shears, 48-in. throat.
Five steam hammers.
Two 2-stage air compressors, 1000 cu. ft. each.
One 40 to 50 hp. stationary high-speed engine.

The Cincinnati, Indianapolis & Western Railroad list is as follows:

One double spindle bolt cutter to thread bolts up to 2-in., equipped with lead screw for staybolt cutting.
One 200 or 250-lb. power hammer, belt driven, complete with motor.
One pipe threading machine for 2 to 6 in. pipe.
Two 14-in. and 18-in. single belt drive wet tool grinders.
One Underwood portable locomotive crank pin turning machine.

The Worthington Pump & Machinery Co., Cudahy, Wis., has revived a list which it issued last summer and is understood to have purchased some of the machines it has

been figuring on. The Jenkins Machine Co., Sheboygan, Wis., is in the market for 12 miscellaneous standard tools, including two engine lathes, one radial drill, one shaper and one hand screw machine.

The Bastian-Blessing Co., brass founder and manufacturer of bells, soda fountains, etc., 125 West Austin Avenue, Chicago, has purchased a site at Elston Avenue and Snow Street, where it will erect a two-story plant, in three sections, each 60x390 ft., to cost $350,000.

The Dawson Mfg. Co., maker of automobile grease cups, 4928 Broadway, Chicago, has purchased a one and two-story plant, 125x128 ft., in Larrabee Street, near Center.

The Hooven Radiator Co., manufacturer of combination tube and honeycomb radiators for automobiles, 517 West Monroe Street, Chicago, has leased a four-story building, 126x126 ft., at 410-420 North Western Avenue, which it will equip for manufacturing purposes at a cost of about $50,000.

The Hub Electric Co., manufacturer of electrical power and lighting equipment, 1819 Carroll Avenue, Chicago, will construct a one-story plant, 105x144 ft., at 2219-33 West Grand Avenue, to cost $40,000.

D. W. McKenzie, manufacturer of phonographs, has awarded a contract for the construction of a four-story plant, 157x165 ft., at 4223-37 West Lake Street, Chicago, to cost $120,000.

The Connelly Iron Sponge & Governor Co., 3154 South California Avenue, Chicago, has let a contract for the reconstruction of its plant recently destroyed by fire.

The National Tea Co., 2715 West North Avenue, Chicago, has had plans drawn for a one-story garage and repair shop, 100x145 ft., to be erected at the southwest corner of Larrabee and Hobbie streets, at a cost of $75,000.

The Chicago Malleable Casting Co., 120th Street and Racine Avenue, Chicago, has let contracts for the erection of a one-story factory, 90x265 ft., to cost $50,000.

The Wahl Co., manufacturer of patent pencils and adding machines, 1800 Roscoe Street, Chicago, has commenced work on a $600,000 addition, 125x175 ft., and four stories.

The M. A. Love Mfg. Co., machinist and founder, and the Ward Pump Co., both of Rockford, Ill., will consolidate as the Ward-Love Pump Corporation, which will be incorporated with $1,500,000 capital stock. Oscar W. Johnson, secretary and treasurer and active manager of the Ward Pump Co., will be general manager of the new company.

The Rock Island Register Co., Rock Island, Ill., is having plans prepared for a $75,000 plant to be erected at Fifth Avenue and Twenty-fifth Street.

The Rock Island Mfg. Co., Rock Island, Ill., is erecting a $25,000 addition to its foundry. The new wing will be 80x120 ft., doubling the present capacity.

The Illinois Foundry & Specialty Co., Morris, Ill., has purchased the Hart foundry at the foot of Hancock Street, Peoria, which will be put in operation soon.

The Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, will construct a new fabricating plant, 135x300 ft., at Southwest Eleventh and Tuttle streets, to cost $100,000.

The Midwest Machine Tool & Supply Co., Davenport, Iowa, has been incorporated with $50,000 capital stock to manufacture machinery, hardware specialties, etc. Harry D. Block is president and H. B. Carlson, secretary and treasurer.

The Midwest Metals Mfg. Co., Des Moines, Iowa, has been incorporated with $30,000 capital stock to manufacture metal dies and stampings. The officers are Ira Steele, president; D. E. Emanuel, vice-president; Donald Harlow, secretary, and Rex Fowler, treasurer.

Early in the spring, the Stromberg Electric Co., 606 South Michigan Avenue, Chicago, manufacturer of electrical devices, will call for bids for the erection of its proposed new plant at Wrightwood and Greenview avenues. The project will comprise a group of buildings to cost about $500,000, with equipment. C. M. Crook is president, Robert J. Newberry, 108 South La Salle Street, is architect.

The Hansell Elcock Co., Archer and Normal avenues, Chicago, manufacturer of iron products, has acquired about 25,000 sq. ft. adjoining its plant at Normal Avenue and Twenty-fifth Street, as a site for an addition.

Deere & Co., Moline, Ill., manufacturer of agricultural equipment, is taking bids for the erection of a one-story and basement plant at Fullerton and Elson avenues, Chicago.

The United States Graphite Co., 80 East Jackson Boulevard, Chicago, has completed plans for a one-story plant, 75x80 ft., on East Ninety-fourth Street, to cost about $25,000.

The Standard Oil Co., Mankato, Minn., is having plans prepared for a new two-story machine shop at its local works, with paint shop department, at a cost of about $100,000. R. G. Stewart is manager.

Cincinnati

CINCINNATI, Jan. 19.

Orders for machine tools continue in steady volume and while no large lists are out manufacturers are well satisfied with business offered. The Navy Department has been in the market and several builders of electrical drilling machines have secured orders aggregating in the neighborhood of 1200 tools. Car builders have also bought during the week, one Iowa concern having ordered five machines. Manufacturers of oil well machinery have purchased some tools, principally planers and radial drills. Some inquiry has been received for export, principally from South America, but a few tools are wanted for Spain and Italy. Railroads are not buying except in single tools, and this is largely confined to the Pennsylvania system.

The Handy Mfg. Co., Cincinnati, has been incorporated with a capital stock of $50,000. It manufactures the Case tire tools, and plans later to erect a factory. A. C. Case is president.

The Wilson Engineering & Contracting Co., Xenia, Ohio, has increased its capitalization from $30,000 to $100,000.

The Dayton Rubber Co., Dayton, Ohio, has increased its capital to $10,000,000, and it is understood that plans are completed for the construction of additional buildings, work to commence shortly.

The Burnett-Larsch Co., Dayton, Ohio, manufacturer of electric pumps and water systems, plans to erect a five-story building equal in size to its present structure, on property recently purchased at Monument and Webster streets. A number of old buildings are being torn down to make room for the new factory.

The Franklin Tractor Co., which recently announced its intention of establishing a plant at Greenville, Ohio, has awarded a contract to Dwyer Brothers, that city, for the erection of a steel and concrete building, 100 x 200 ft., to cost $40,000. It is expected to be ready for the installation of machinery about April 15.

The E. H. Bardes Range & Foundry Co., 2619 Colerain Avenue, Cincinnati, will soon call for bids for the erection of a one-story and basement addition, 85 x 100 ft., to be equipped as a core and pattern works.

The N. S. Machine Tool Co., Richmond Street, Cincinnati, has commenced the erection of a one-story machine shop, 41 x 47 ft., on West 6th Street.

It is reported that the Cincinnati Grinder Co. is contemplating the erection of a two-story addition, 60 x 107 ft., to its plant on Colerain Avenue. The company recently purchased additional property on Alabama Street.

The Nolte Screw Machine Products Co., Cincinnati, has been incorporated with a capital of $75,000, and is receiving bids for an extension to its plant on Freeman Avenue. New machinery will be installed to take care of increased business.

The Lewellen Mfg. Co., Columbus, Ind., has about completed a new brick and concrete factory, 65 x 225 ft., and will manufacture a complete line of power transmission supplies. It is in the market for a 34 in. boring mill; 16 to 24 in. lathe, with a 16 to 20 ft. bed; pattern shop planer, 18 or 20 in.; disk grinder, and 16 to 20 in., leather stripping, and leather slitting machines. It also requires 10 motors, 5 to 25-hp., 220 volts, three-phase. D. E. Lewellen is president.

The Columbus Die, Tool & Machine Co., Columbus, Ohio, has purchased eight acres on Seventeenth Avenue, adjoining the Pennsylvania tracks, and it is understood will construct a building on the site. H. H. Price is president of the company.

The Columbus Dental Mfg. Co., Columbus, Ohio, has awarded the general contract for an addition to its plant to E. H. Latham of that city. The work will be done on a cost-plus basis. Otto Darst is the architect.

The Ohio Malleable Iron Co., Columbus, Ohio, has taken out a permit for the erection of an addition to cost $35,000.

The Westcott Motor Car Co., Springfield, Ohio, has under construction a new building, 125 x 250 ft., together with other improvements. It plans to double its output this year.

The Engineering & Development Co., Dayton, Ohio, has increased its capitalization from $100,000 to $500,000. It manufactures and installs paper making plants.

The Immel Co., Columbus, Ohio, has under construction a building 250 x 350 ft., with sawtooth roof, to be used in the manufacture of closed bodies for automobiles.

Detroit

DETROIT, Jan. 19.

Business the first two weeks of this year has been of good proportions, but few large orders have been reported, the most recent being that of the Continental Motors Corporation for about $150,000 worth of machinery for its Muskegon plant. Most of the orders have been for single machines or small lots. Automobile and accessories manufacturers are active purchasers, but machine-tool dealers express fear that they may soon refuse to commit themselves on deliveries far in the future, on account of rising costs.

The Mueller Metals Co., Port Huron, Mich., during the last month increased its force from 500 to about 600 employees and is operating 24 hr. a day. Its output is growing every week as new machines are added.

The drop forge plant of the Continental Motors Corporation, Muskegon, was recently destroyed by fire with a loss of about $50,000.

The Brummeler-Ruggles Metal Products Co., Grand Rapids, Mich., has been organized with a capital stock of $50,000 to manufacture all-metal cabs for motor trucks. It plans to erect a factory and expects to have it completed and in operation in the spring.

The Detroit Lead Pipe Works, Detroit, has purchased a site on the northwest corner of Second Avenue and Larned Street and contemplates erecting a new structure for office and manufacturing purposes.

It is announced that a new $5,000,000 corporation will locate in Ludington, Mich., giving immediate employment to at least 500 men. The concern will manufacture Monroe bodies for the Nash Motors Co., Kenosha and Milwaukee, Wis. The city of Ludington will vote $100,000 bonds for the factory, which will be paid over after the company has paid out $2,500,000 in wages.

The Brunswick-Balke-Collender Co., Muskegon, Mich., will break ground early in the spring for an addition to its tire manufacturing plant, which will give it a capacity of 5000 tires a day.

The Clark Equipment Co., Buchanan, Mich., will erect a plant at Battle Creek to manufacture Clark automobile axles.

The Reagle Brass Co., Greenville, Mich., contemplates the erection of a plant.

The Detroit Edison Co., Detroit, is having plans prepared for a new power plant, 75x100 ft., on Bounce Creek, Marysville, Mich.

The Schiewe Coal & Coke Co., 630 Mack Avenue, Detroit, has had plans prepared for a new coal handling plant to be erected at Meldrum and Mack avenues.

The Hudson Motor Car Co., Detroit, has broken ground for the erection of a four-story addition at Jefferson Street and Connors Road, 80x525 ft.

The Jackson Screw Products Co., Jackson, Mich., has completed plans for a one-story addition, 50x120 ft., on East Washington Avenue.

The Saginaw Motor Truck Corporation, Saginaw, Mich., has been incorporated in Delaware, with capital of $10,500,000 by Charles F. Burger and R. E. Joslin, Saginaw, and James H. Pierce, Bay City, Mich., to manufacture motor trucks.

The Detroit Steel Products Co., West Grand Boulevard, Detroit, has arranged for the erection of a one-story addition, 106 x 313 ft., to be equipped, in part, as a spring shop. It will cost about $80,000.

Milwaukee

MILWAUKEE, Jan. 19.

Machine-tool orders forming a large aggregate are coming out as the holiday and inventory period disappears. The automotive industries are presenting broad needs, covering a wide variety of equipment. Milling machine builders are receiving new business in greater amount than during the latter part of 1919 and are constantly obliged to extend deliveries.

The T. L. Smith Co., 1125 Thirty-second Street, Milwaukee, manufacturer of concrete mixers and construction machinery, has increased its authorized capital stock from $800,000 to $1,250,000 to finance the expansion of business the past year and to provide for further extensions. T. L. Smith is president and general manager.

The Davis & Thompson Co., Milwaukee, has filed articles of incorporation with an authorized capital stock of $100,000 to manufacture machine tools, machinery, etc. The organizers are Frank M. Davis, John T. Thompson and Edgar L. Wood, attorney. Messrs. Davis and Thompson have been developing a new design of continuous milling machine for the last two years and are now preparing to engage in quantity production at Milwaukee. Both formerly were officers of the Davis Mfg. Co., Milwaukee, now the motor works of Avery Co., Peoria, Ill. A site for the proposed plant has been purchased and construction work will be undertaken early in the spring. Details will be announced soon.

The Milwaukee Stamping Co., Milwaukee, has awarded the general contract to the William F. Tubesing Co., Wauwatosa, Wis., for a three-story addition, 80 x 140 ft., at Sixty-fourth and Pullen avenues, in West Allis. August J. Petrie is president.

The Racine Confectioners' Machinery Co., Racine, Wis., is taking bids through D. R. Davis, local architect, for a two-story addition, 50 x 160 ft., and a one-story shop, 40 x 150 ft., of brick and steel. The smaller shop will be equipped with a craneway with a 36-ft. span, for which an electric traveling crane will be purchased. All other equipment has been placed.

The Jambor Tool & Stamping Co., Milwaukee, has filed articles of incorporation with a capital stock of $100,000 to manufacture tools, dies, jigs, fixtures, stampings, etc. The incorporators are John E. Jambor, Harry E. Pressinger and John G. Stenger, all officers of the Jambor Mfg. Co., 911 Center Street, Milwaukee, of which the new corporation is an outgrowth.

The American Skein & Foundry Co., Racine, Wis., has contracted with Nelson & Co., Racine, for the construction of a brick and steel addition, 100 x 240 ft., to its casting shop.

The Oshkosh Motor Truck Co., Oshkosh, Wis., manufacturer of quadruple drive commercial vehicles, is increasing its capital stock from $500,000 to $1,500,000 to finance the construction and operation of a new factory, 80 x 310 ft., with an initial capacity of 500 trucks in 1920. Work will begin about April 1. William A. Besserdich is chief engineer.

The Litnum Bronze Co., Menomonie, Wis., manufacturer of a patented alloy metal, has purchased the plant, equipment and good will of the Progress Mfg. Co., Erie, Pa., and will consolidate the works in its plant at Menomonie. The Progress company manufactures die-casting machinery and die castings.

The National Gauge & Equipment Co., LaCrosse, Wis., has let the contract for a one-story brick and steel shop addition, 135 x 352 ft., to A. H. Mitchell, local contractor. Considerable new equipment for making metering gages and other automotive accessories will be purchased.

The Hexmen Moto Co., Racine, Wis., has been incorporated with a capital stock of $30,000 by six department heads of the Mitchell Motors Co., to develop and manufacture an auxiliary carburetion device for internal combustion engines. Inquiry is being made for machinery for a shop which will be established early in the spring. The officers are: President, C. W. McDowell; vice-president, F. C. Deacon; secretary, E. R. Jacobi; treasurer, David Hansen.

The Northwestern Electric & Machinery Co., 245-247 Oregon Street, Milwaukee, has increased its capital stock from $25,000 to $50,000. Hyman Meyer is president.

The Slinger Foundry & Machine Co., Portage, Wis., has plans for an addition to its gray iron foundry which will double the capacity of the molding floor and enable it to pour metal twice a week instead of once, as at present. The improvement will cost about $20,000.

The Racine Automotive Engineering Co., Racine, Wis., has been organized by Ralph W. Davis, chief engineer, and Arthur O. Engstrom, assistant chief engineer Mitchell Motors Co., who resigned Jan. 1 to engage in the general practice of engineering with relation to the automotive industries. The buildings and equipment of the Central Garage Co., 408 Wisconsin Street, Racine, have been taken over as experimental and construction shops.

The Ajax Auto Parts Co., Racine, Wis., has increased its capital stock from $5,000 to $100,000 preferred stock plus 2000 shares of common stock without par value. It will embark on a plant construction and equipment project amounting to $75,000 early in the spring.

The Automotive Foundry Co., LaCrosse, Wis., has engaged W. S. Woods, local architect and engineer, to design a gray iron foundry, 100 x 150 ft., to cost about $50,000 with equipment.

The Board of Education, Baraboo, Wis., will build a junior high and vocational training institute estimated to cost $100,000. An architect will be selected soon. E. P. McFetridge is president of the board.

The G. & M. Machine Co., of West Allis, Wis., has been granted a charter to manufacture metallic castings, machinery, tools, etc. Its capital stock is $7,500. The incorporators are George P. and William E. Gerlinger, principal officers of the Gerlinger Steel Castings Co. and Gerlinger Electric Steel Foundry Co., West Allis. A. E. Menningen also appears as an organizer.

St. Louis

ST. LOUIS, Jan. 19.

The Mid Continent Brick & Tile Co., Tulsa, Okla., will add a crusher and double the mechanical equipment of its plant.

The Kansas City Structural Steel Co., Kansas City, Mo., will increase its capital stock by $500,000 and add to its equipment.

The Century Electric Co., 1827 Pine Street, will erect a six-story addition for the manufacture of electric motors.

The Blackmer & Post Pipe Co., St. Louis, will erect a machine shop and factory addition.

Heggem & Davis, Kennedy Building, Tulsa, Okla., will erect a foundry and machine shop at Collinsville, Okla.

The O. K. Welding Machine Co., McAlester, Okla., G. H. Denny and others interested, will equip a $75,000 plant for the manufacture of machinery.

The Muskogee Iron Works, Muskogee, Okla., S. M. McManua manager, will equip a machine shop at a cost of about $50,000.

The Shreveport Petroleum Products & Refining Co., Shreveport, La., will equip a refinery with a daily capacity of about 5000 bbl. for the first unit.

The Paramount Oil Co., Shreveport, La., George A. Todd engineer, will equip a refinery, pipe line, etc., with a daily capacity of 7000 bbl.

The Bentonville Ice & Cold Storage Co., Bentonville, Ark., will increase its mechanical equipment about 100 per cent.

The Johnson Commercial Body Co., Fort Smith, Ark., manufacturer of automobile bodies, is planning for the erection of an addition, 140 x 300 ft., for the manufacture of motor-truck bodies. It was recently incorporated with a capital stock of $150,000. Fred B. Johnson is president.

The National Lamp Division of the General Electric Co., St. Louis, is planning for the erection of a new plant at Union and Brown streets, to cost about $500,000, including equipment. George W. Patterson, St. Louis, is the company engineer. Headquarters are at Nela Park, Cleveland, Ohio.

The St. Louis Truck Hardware Co., 906 Chouteau Avenue, St. Louis, has awarded contract to Nier & Meng, 1039 Marion Avenue, for the construction of a one-story addition, 35 x 48 ft F. G. Koehler is president.

The Strauss Motor Car Co., St. Louis, has leased the four-story building, 65 x 109 ft., to be erected by the Leonard-Locust Investment Co., for the establishment of a new service works and repair shop. The structure, with equipment, will cost about $200,000.

The Johnson City Foundry & Machine Co., Johnson City, Tenn., has increased its capital stock to $100,000.

Texas

AUSTIN, Jan. 19.

The La Porte Water, Light & Ice Co., La Porte, has been incorporated with a capital stock of $13,000 to equip a water and electric light plant and ice factory. H. R. Dean is a stockholder.

The Tennison Brothers Saddlery Co., Dallas, will erect an eight-story reinforced concrete addition to its plant and equip it for manufacturing hand bags and other leather goods. The proposed improvement will cost $300,000. Dr. J. B. Cranfill is president.

The All-Tex Refining & Holding Co., Fort Worth, has purchased 20 acres at Stephenville upon which it will build a refinery with a daily capacity of 2500 bbl. The company has a capital stock of $350,000.

The State Refining Association, Dallas, has increased its capital stock from $150,000 to $300,000 and will build a refinery in that city with a daily capacity of 1500 bbl. Shearon Bonner of Dallas is president.

The Bexar Farmers' Gin Co., Marion, has been incorporated with a capital stock of $20,000 and will build a cotton gin. H. A. Rosebrook is a stockholder.

The Munger Automobile Co., 2211-17 Commerce Street, Dallas, is planning for extensions and improvements for the production of automobile parts, to cost about $100,000. R. L. Munger is president.

The Armstrong Farm Tractor Co., Abilene, Tex., has acquired property at Sweetwater for its proposed new plant for the manufacture of motor-driven tractors and parts. It will cost in excess of $200,000.

The Jacksonville Compress Co., Jacksonville, Tex., is said to be planning to rebuild its plant, recently destroyed by fire with loss of about $200,000, including equipment. H. F. Underwood is head of the company.

The Pacific Northwest

SEATTLE, Jan. 13.

The Brew Mfg. Co., Puyallup, Wash., will enlarge its sawmill by the addition of equipment costing $10,000. A planer will be installed, with capacity of 350 ft. per minute.

The Carman Mfg. Co., Portland, furniture manufacturer, plans to immediately double its present factory by an addition 80 x 150 ft., to cost about $33,000. New equipment will be installed.

The Portland Stove Works, Portland, will immediately rebuild its plant, destroyed by fire, and has awarded contract for a building 100 x 400 ft. It will cost complete more than $50,000.

The Marvel Adding Machine Co., Colville, Wash., has been incorporated for $6,500 by Ivan L. Hoffer and others. It will establish a factory for the manufacture of mechanical calculating machines.

Canada

TORONTO, Jan. 19.

There is no let up in the demand for machinery and tools in this market and inquiries received indicate a steady improvement in the call for all types. Several American tool manufacturers have decided to open bank accounts in Canada to overcome the exchange situation, which will make it possible for Canadian buyers of American products to get 100 cents for the dollar instead of having to pay the high rate of exchange now prevailing. Deliveries are becoming more distant and dealers are refusing to give any definite date, some lines of standard tools being advanced to February, 1921. One Canadian company has placed an order for delivery in December. Dealers are endeavoring to advise manufacturers to find out what their requirements will be in from six to eight months, so they can place orders now and be assured of delivery when the tools are wanted. Second-hand and re-built tools are being picked up by those unable to wait for new machines.

The Toronto District Salvage Board Ordnance Department, United States Army, 39 Adelaide Street East, Toronto, has the following equipment and supplies for immediate disposal: Accumulators, air compressors, belting, blowers, Brinell machines, chucks, circuit breakers, dies, drilling machines, forges, furnaces, generators, grinders, hoists, lathes, millers, motors, presses, pumps, pyrometers, reamers, scales, scleroscopes, screw machines, shapers, switch boxes, taps, tanks, tensile machines, transformers, vises, welding equipment, etc.

The Dominion Bridge Co., Montreal, will spend $1,000,000 on new and used equipment for its plant, and is in the market for planers, boring mills, etc. The company has recently made several large purchases in the United States.

The Dominion Steel Products, Ltd., Brantford, Ont., has started work on a new foundry, 100x160 ft. It will be equipped with two cupolas and a 16-ton air furnace for casting heavy steel mill rolls and rolls for rubber-working machinery. It has also purchased an electric furnace for smelting non-ferrous alloys. The company expects to have the foundry in operation in about eight weeks.

J. J. Coughlan & Sons, Vancouver, B. C., have been awarded by the Canadian Government a subsidy contract for the construction of a dry dock at Vancouver, B. C., to cost $3,750,000. The company will finance the undertaking and will receive a percentage subsidy when the work is completed.

A plant will be established in Brantford, Ont., for the manufacture of Bluebird electric appliances. Local capital amounting to $200,000 has been subscribed. J. B. Detweiler, general manager of the local branch of the Steel Co. of Canada, will be president of the new concern, and will sever his connection with the Steel company. The old plant of the Brantford Motor Trucks will be equpiped by the new company.

The Kelly-Springfield Tire Co., Seventh Avenue and Fifty-seventh Street, New York City, will establish a plant in Canada but has not yet decided on a location. C. A. Brown is vice-president.

The Dunlop Tire & Rubber Co., Booth Avenue, Toronto, has set aside $1,500,000 for extensions and new equipment. The company has started work on the erection of a plant at the corner of Booth Avenue and Queen Street.

The Eclipse Machine Co., Elmira, N. Y., has purchased a factory at Walkerville, Ont., which it will remodel and equip at once for the manufacture of its product. John C. Ferguson is general manager.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per lb.
Refined iron, base price	4.25c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 4.00c.
1 to 6 in. x ⅜ to 1 in	3.52c. to 4.00c.
1 to 6 in. x ¼ to 5/16	3.62c. to 4.00c.
Rods—⅝ and 11/16	3.57c. to 4.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 4.75c.
Hoops	4.47c. to 5.50c.
Shapes:	
Beams and channels—8 to 15 in.	3.47c. to 3.90c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 3.90c.
3 in. x 3/16 in. and ⅛ in	3.72c. to 4.25c.
1½ to 2½ in. x ⅛ in	3.52c. to 4.05c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 4.00c.
1 to 1¼ in. x 3/16 in	3.52c. to 4.45c.
1 to 1¼ x ⅛ in	3.57c. to 4.50c.
⅞ x ⅞ x ⅛ in	3.62c. to 4.60c.
¾ x ⅛ in	3.67c. to 4.65c.
⅝ x ⅛ in.	4.07c. to 5.00c.
½ x 3/32 in.	5.17c. to 5.70c.
Tees:	
1 x ⅛ in	3.87c. to 4.75c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 4.50c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 4.10c.
3 in. and larger	3.52c. to 3.95c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.52c. to 4.00c.
Toe calk, ½ x ⅜ in. and larger	4.35c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 4.25c.

Sheets

Blue Annealed

	Per lb.
No. 10	5.07c. to 5.80c.
No. 12	5.12c. to 5.85c.
No. 14	5.17c. to 5.90c.
No. 16	5.27c. to 6.00c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	6.30c. to 6.80c.	
Nos. 22 and 24	6.35c. to 6.85c.	7.80c.
No. 26	6.40c. to 6.90c.	7.85c.
No. 28	6.50c. to 7.00c.	8.00c.
No. 30	6.60c. to 7.20c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	6.75c. to 8.50c.
No. 16	7.00c. to 8.75c.
Nos. 18 and 20	7.15c. to 8.90c.
Nos. 22 and 24	7.30c. to 9.05c.
No. 26	7.45c. to 9.20c.
No. 27	7.60c. to 9.35c.
No. 28	7.75c. to 9.50c.
No. 30	8.25c. to 10.00c.

No. 28, 36 in. wide, 20c. higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per lb.
Bright basic	7.50c.
Annealed soft	7.50c.
Galvanized annealed	8.00c.
Coppered basic	8.00c.
Tinned soft Bessemer	9.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over [illegible]ed.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$8.80	$8.55
		90 lb....	8.90	8.65
		100 lb....	9.00	8.75
IC...$15.00	$13.00	IC...	9.25	9.00
IX... 17.25	15.00	IX...	10.25	10.00
IXX... 19.00	16.75	IXX...	11.25	11.00
IXXX... 20.75	18.50	IXXX...	12.25	12.00
IXXXX... 22.25	20.25	IXXXX...	13.25	13.00

Terne Plates

8-lb. Coating 14x20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	66c.
Bar	70c. to 75c.

Copper

Lake ingot	22c. to 23c.
Electrolytic	21c. to 22c.
Casting	20½c. to 21c.

Spelter and Sheet Zinc

Western spelter	10½c. to 11½c
Sheet zinc, No. 9 base, casks	13½c. open 14c.

Lead and Solder*

American pig lead	9½c. to 10½c.
Bar lead	10½c. to 11 c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	11½c. to 12½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb...35c. to 38c.

Old Metals

The market is firm. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	17.50
Copper, heavy and wire	16.50
Copper, light and bottoms	14.50
Brass, heavy	11.00
Brass, light	8.00
Heavy machine composition	16.00
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	13.00
Lead, heavy	6.75
Lead, tea	4.50
Zinc	5.50